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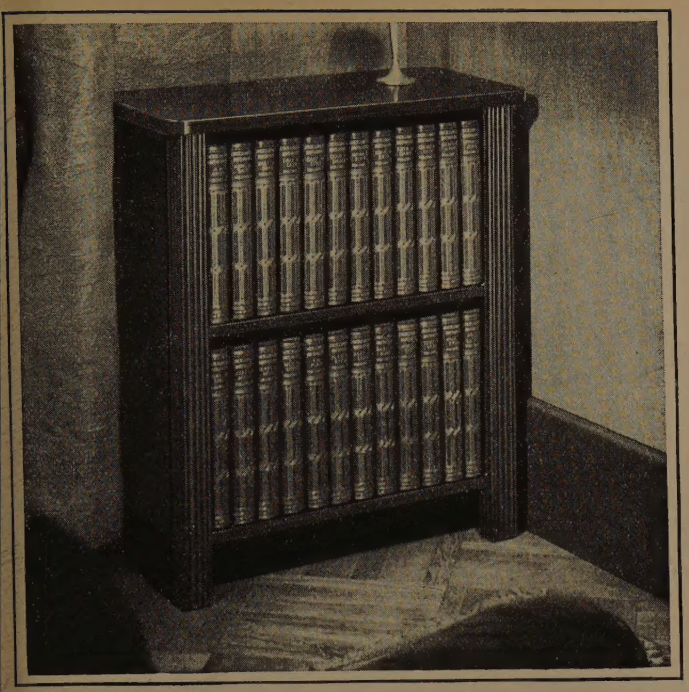

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SMALL CAMERAS

(Continued from September)

The newspaper photographer or expert professional working in the field where he cannot use a tripod and very awkward equipment uses the type of camera called a reflex camera. A reflex camera is a type of camera made with a mirror which reflects the image coming through the lens to a ground glass at the top of the camera, so that the operator can see just what the lens sees. The photographer can, therefore, focus the image accurately on the ground glass, and, if he has good eyes, he knows that he has made no mistake in the focusing of the picture. This type of camera is generally more expensive and heavier than the ordinary type, because of the ingenious mechanical devices needed to snap the mirror up out of the way when the picture is exposed. Most cameras of the reflex type also use a different method of exposing the film. Instead of having a little shutter right next to the lens, which opens and closes for the taking of the picture, there is another type of shutter called a focal plane shutter. The name focal plane is derived from the fact that the shutter is right in front of the film or plate and operates like a curtain. It is, therefore, right in front of the focal plane of the lens. This type of shutter is used chiefly for cameras where a very short exposure is desired, say, one one-hundredth of a second or less. The slit in the curtain which moves in front of the lens admits light to only one part of the film at a time. It is supposed to give a more even exposure and to catch rapid movement with a minimum of blurring. The best known camera of this type is, perhaps, the Graflex.

On a rough trip some experts do not like the reflex type of camera because there are more things to get out of order. If the mirror snaps up with too much of a bang, it sometimes shakes the camera and blurs the picture slightly. The focal plane shutter also operates with much more noise than a shutter on the lens itself. Where the noise feature is undesirable, as in photographing some types of wild animals, the simpler type of shutter next to the lens is often more desirable. In an effort to overcome these objections to the ordinary reflex camera and to gain the maximum simplicity of operation, there has been placed upon the market a little camera made in Germany, known as the Rolleiflex. This very compact little camera takes pictures no larger than 2½ inches square, but they are so sharp as to be capable of a great deal of enlargement. Instead of a mechanism to snap the reflecting mirror out of the way, this camera is really two cameras in one. It has two lenses geared together, so that the focusing of one focuses the other. The upper lens reflects the image by means of a mirror to a ground glass, and the image on the ground glass is viewed through a magnifier, so that it is possible for an amateur to get the maximum degree of sharpness in the picture. But the picture itself is taken by a lens below the focusing lens and with a quietly operating lens shutter. By these means the objections sometimes offered to the ordinary type of reflex camera are overcome. Furthermore, the camera is extremely simple to operate and uses regular roll film which may be obtained anywhere.

Many amateurs who have taken great care with their picture taking are disappointed to find, when they come back from their summer's trip, that many of the pictures are hazy when they ought to be clear and sharp. The reason for this may be that some dust or dirt has gotten onto the lens. Especially when one is hiking or riding along a dusty way, dust seeps into even the tightest of cases. The only sure way of avoiding this is to look at the outside of the lens every time the camera is taken out for picture taking and to brush it off with a little camel's-hair brush, with a very fine, closely woven handkerchief which gives no lint, or with lens cleaning tissue sold by opticians. One has to be careful to dust the lens off and not to rub the dust in. Avoid breathing on a lens to clean it. There is a peculiar chemical effect of the human breath, more marked in some people than in others, which, when applied, tends to dim permanently the brilliancy of glass. Never, by any chance, touch the surface of a camera lens with your fingers. They will almost surely leave a mark. If these precautions are taken, many spoiled pictures will be prevented. One of the greatest after-pleasures of a summer trip is the enjoyment of the pictures taken. If one has the time and the facilities to do the finishing oneself, this pleasure is greatly enhanced; but one should practise on less important films, so as to become somewhat proficient. The most fun comes in enlarging pictures and parts of pictures. There are several small enlarging cameras on the market which can be readily operated by an amateur. With one of these, little pictures can be made into big pictures, or parts of pictures can be made into pictures complete in themselves. The technique is not difficult for any intelligent person to master.

Have you ever wondered how some certain picture was taken? Perhaps you have stood at the base of a mountain and pointed your camera at it, only to find when you looked into the finder that your lens could not possibly take in the whole of the scene before you. There are tricks which professionals use to get around this difficulty. For example, the makers of Zeiss lenses, with which many cameras are equipped, also make a little extra lens which fits over the regular lens like a cap and has the effect of widening the angle, so that from a given distance more landscape can be included. The difficulty is that all supplementary lenses change the focusing of the camera, and, unless one has a reflex camera or a camera of some type which can be focused on a ground glass, one cannot get anything like a sharp picture. But here, again, is one of the advantages of the reflex cameras. There is also another kind of outside lens which acts to narrow down the angle and bring things nearer. This, however, again changes the focusing of the camera and increases the amount of exposure necessary to get a proper picture. These suggestions are made not for the beginner particularly, but to show that the field of photography offers a never-ending series of fascinations and a never-ending procession of opportunities which may be grasped with growing experience.

Of Varied Interest

Home movies are getting down within reach of a lot of us folks to whom it has always seemed fascinating but something we couldn't undertake without mortgaging the old homestead. Eastman has aided the downward revision of prices by drastic cuts in Ciné-Kodak prices.

And those who now feel they can undertake home movies will find *Movie Makers*, the magazine of the Amateur Cinema League, always a helpful source of ideas and inspiration. It's a beautifully edited book.

While we are on the subject of movie cameras, may we remark on the relative speed of supersensitive film? It is twice as fast, in daylight, as the regular panchromatic, and four times as fast in artificial light. The additional red and yellow rays in the latter account for this.

We made a roll of pictures the other day with the tiny Eno camera that Burleigh Brooks handles. Then we had some enlargements made. We were amazed at the results—good, of course. It makes a mighty neat little gift for a youngster just getting acquainted with stops and so forth.

The Biological Photographic Association is publishing a journal, the first issue of which will be mailed on the first of September. The purpose of the journal is to keep the biological photographer posted in the latest developments in photographic technique, and the proper use of equipment and materials in relation to the biological sciences. It will contain articles by authorities in the field of biological photography. They will tell, in simple language, how to obtain what are ordinarily considered difficult pictures in the easiest possible manner. They will discuss new equipment and its uses. The journal will have pictures and articles on advanced photographic apparatus constructed by the research workers of the photographic departments of the foremost American and foreign universities, including medical and dental schools. The subjects of clinical and gross photography, cinemicrography and natural-color processes will be fully discussed in the pages of this journal from time to time. The projection of sound and silent motion pictures, to say nothing of lantern slides in color and black and white, will be given due consideration. Anyone wishing a free copy of the first issue may obtain it by writing to the editorial office at 519 E. Lombard Street, Baltimore, Maryland.

In *Film Play Production for Amateurs*, written by George H. Sewell and published by Isaac Pitman & Sons, 2 West Forty-fifth Street, New York City, the beginning photoplay producer will find an interesting and helpful guide to this subject. Succeeding chapters discuss in a pleasantly simplified manner such subjects as the film story and continuity, personnel, equipment, scenery and properties, makeup, and editing and titling.

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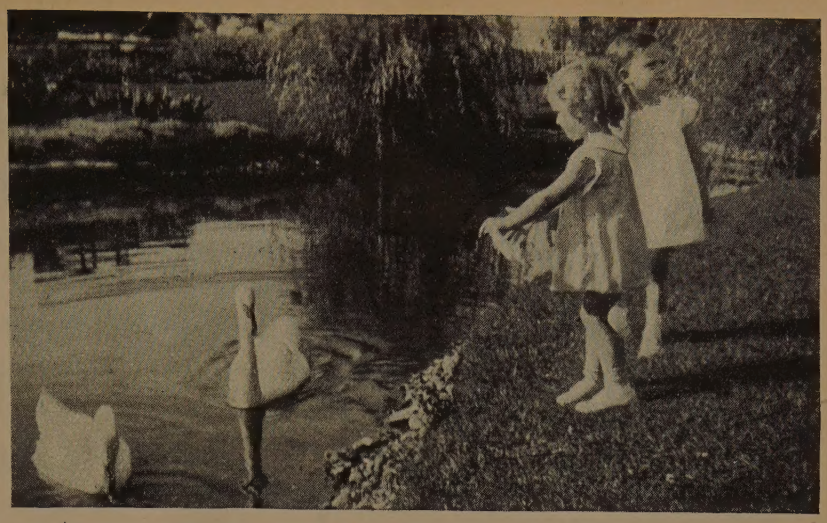

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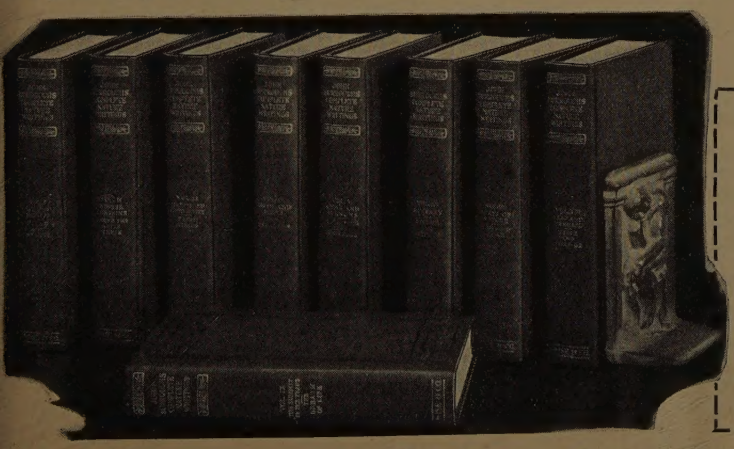
What are the best times of day to foretell the next day's weather?

Why do white flowers have perfumes more often than colored ones?

Why do oaks and chestnuts spring up where a pine forest has been cut down?

What bird dives for fish and spears them with its long sharp bill?

What bird always lines its nest with the cast-off skin of a snake?



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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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CONSERVATION THINKING

• • •

HOW CAN WE APPLY IT TO OUR NATIONAL PROBLEMS?

THE other day we received a call from the conservation chairman of a local garden club. "I don't know what our organization can do this year," she declared. "There doesn't seem to be any interest in conservation. Everyone is too interested in the elections, and every idea seems dwarfed in comparison with the truly great political and economic problems of the moment."

And that gave us an opportunity to explain a thought. What is conservation but the application of the fundamental truth that man, being dependent upon Nature in greater or less degree for all of his needs and wants, must not consume without sound provision for replacement in the future? So-called conservationists in the past have thought most often in terms of such physical natural resources as oil, coal, forests, fish, game, and other wild life; but these limits are arbitrary, and there is a wider application of conservation thinking thus far almost totally neglected.

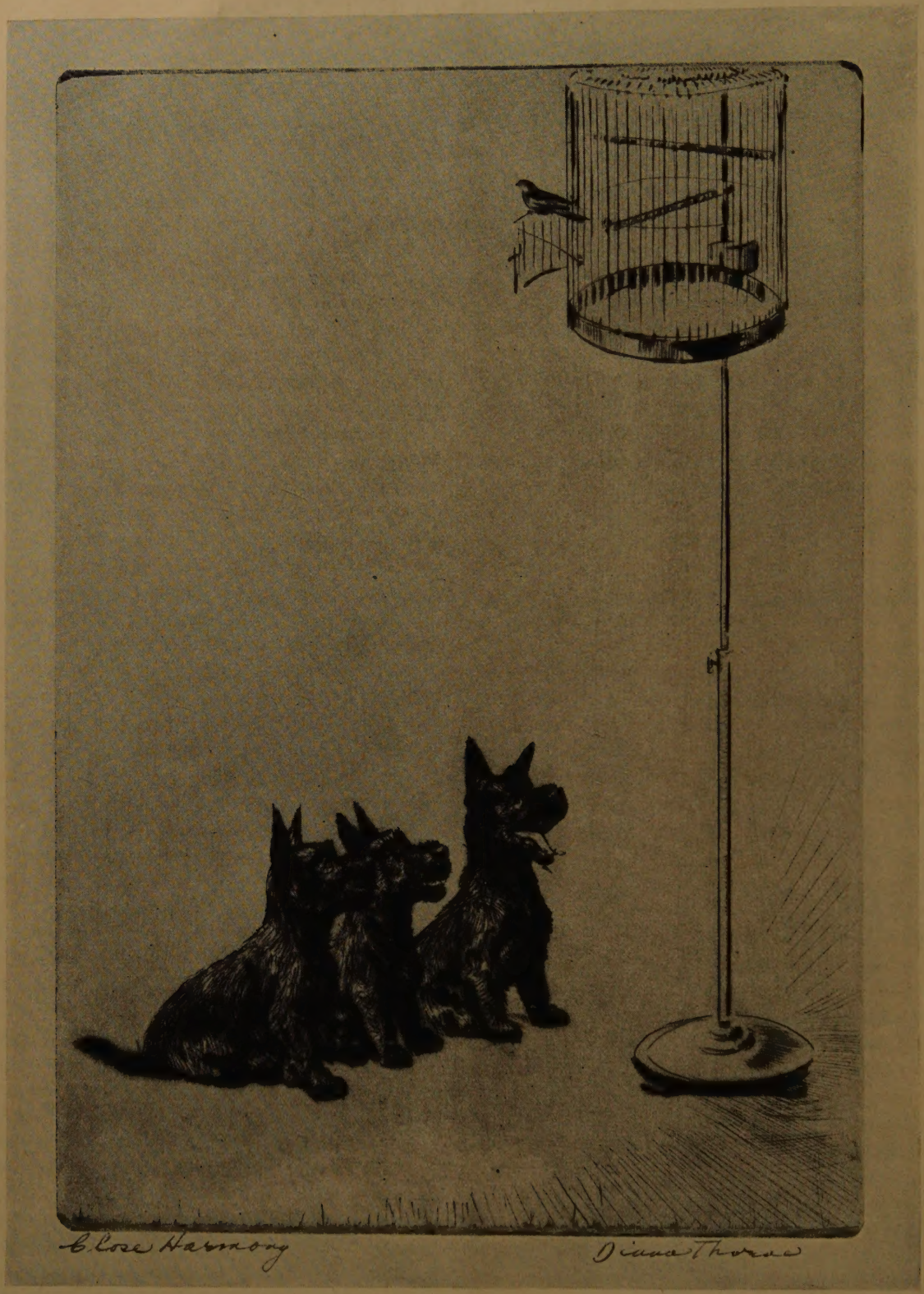
To make this clear, let us take an example of what we mean by conservation principles. The wise forester estimates the quantity of wood in his forest and that he calls capital. He estimates the rate of growth of the trees and from that figure determines on an average how much may be cut in any given year without depleting his capital. This figure, which the forester calls the "yield," is his potential income, and within that income he must balance his budget. But is that the way our governments reason? Consider a great city containing within its borders great manufacturing plants, many kinds of good business, many thousands of typical American homes. The "yield" of this community in the form of reasonable taxes reaches a certain figure which the government elected by the people may spend. But does it limit its spending to that yield? Probably not. Why not? Because the people, lacking knowledge of conservation, have not demanded it. Because such intelligent demand as there is for the application of conservation has been lazy, uncaring and inarticulate.

When the American family wants a radio or an automobile, is it purchased with the annual yield or income saved for the purpose? Often it is not. That radio or automobile is bought by means of a lien on future earnings. But conservation teaches that there is no way to take continuously more than the annual yield without depleting capital for the future. Installment buying, viewed from the conservation angle, becomes merely a trick of borrowing a little from next year's yield to make the present yield seem larger. If that which has been borrowed is not replaced next year by saving, then the sum total of wealth, which is the only source of real prosperity, has shrunk by just that much. Our American family, like our American Government, needs lessons in elementary conservation principles.

You who would work for conservation—think of the opportunity before you! Here is the greatest demand for your knowledge and your efforts that this nation has ever known. You can see clearly. You know that wealth is but the sum total of natural resources plus the labor of man. If these things are wasted by directing them into unproductive channels, the effect is no different from the burning up of a forest or the explosion of an oil well. Gradually the forest may grow again; in countless centuries oil may form again; after years of hard work capital will gradually accumulate again. But in the meantime—what? The laws of Nature are inexorable. Now is the time, if ever, to push conservation education in the schools through Nature teaching. Now is the time to save our children from the results of destructive thinking.

"That sounds splendid," replied our visitor. "But couldn't you be a little more specific? I agree with what you say, but our club members want to be told definite things to do. I think we surely ought to get the ideas you have just expressed into our outline for teaching Nature and conservation in the schools, so as to show clearly the connection between studying conservation of natural resources and training for really useful citizenship. But isn't there something else we could do?"

We gave her this answer. Now, if ever, the intelligent people of every community *must* think for themselves. They must realize that conservation isn't merely a matter of flowers and forests, of oil wells and birds and beauty. Conservation lies at the root of our life as a nation. If America is to be saved from the consequences of continued breaking of the laws of conservation, every man or woman who can think clearly must make his thought *felt*. How? Write every month, or oftener, to every one of those you have helped to elect to public office in city, state, and federal government. Tell them over and over again the conservation principles you believe and know to be true, and how you think these principles may be applied to whatever public question of the moment is before them. Talk to your friends—help them to see things with the conservationist's mind. Write letters to editors; write articles, if you can. In this way and in this way only can a democratic form of government successfully reflect the will of its citizens. In this way only can America achieve a *permanent* way out of depression and misery.



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WANDERLUST OF THE WILD

THE MYSTERY OF MIGRATION AMONG NON-MIGRATORY CREATURES

BY J. FRANK DOBIE

ILLUSTRATED BY R. BRUCE HORSFALL

NOTHING in all Nature—not even the creep of glaciers, the eruption of volcanoes, or the transcontinental sweep of human races—is more dramatic, more awe-inspiring, more wonder-arousing than the migrations of the animal world—whether among insects it be armies of grasshoppers denuding an empire, dragon-flies racing in clouds ahead of the biting wind of the Argentine plains, or butterflies all silent and lovely floating down valleys like the fogs of morning; whether in the bird kingdom it be the flying wedges of great Canadian geese uttering heart-shaking cries, or those bits of animated color, more ethereal than the feathers that flash their hues, known as hummingbirds; whether in waters it be giant salmon leaping up river-falls a thousand miles from their salty home to spawn, or turtles by the millions swarming forth in June from the Gulf of Mexico to lay their eggs on the Mexican sands, while coyotes and Indians gather to eat the eggs and vulturine *zopilotes* swoop in for their annual gormandizing; whether on land among ruminants it be the mighty-antlered caribou crossing the snows of the north, the shaggy American bison zigzagging in herds uncountable across the Staked Plains, or Hudson's huanaco of the pampas, drawn by some imponderable instinct, traversing long distances in order to lay down its life on a common death bed. Air, water, and earth have alike been mapped to show the routes of these habitual migrants. Their habits and instincts have been scrutinized by scientists and have aroused the wonder of even the most phlegmatic earth-dwellers who know nothing of science. The regularity of their movements has associated them in the minds of all people with elemental things like heat and cold, grass and drouth, darkness and sunlight, motion and repose.

J. Frank Dobie of the University of Texas knows the story of the plains and the romantic history of the Lone Star State about as well as any man alive. And he writes about it with both charm and understanding. To the Texas issue of Nature Magazine he contributed the leading story telling of the development of his great State, and with this present article we are delighted to welcome him again to our pages.

Just as wonderful and more puzzling, though hardly known to students of Nature, have been the sporadic migrations of certain animals commonly regarded as non-migratory. Their migrations can not be observed now, because the creatures no longer exist in numbers sufficient to mass themselves. Perhaps, too, the scattering remnants know that if they left their hiding places they could not traverse the peopled world and find refuge.

The phenomena I am about to record have been gathered from the chronicles of men who were in the Southwest when it was yet a vast wilderness, or desert—whichever one wishes to term it—unfenced and unpeopled and still rife with the creatures that Nature in the course of millions of years had adjusted to the scene before man interfered.

The lobo, or gray wolf of the prairies, often regarded as a variety of the timber wolf, has been all but exterminated from the United States. The animal was once very common and was certainly the most predatory creature known to stock-growers. Lobos usually ran singly or in twos and threes, though they would often band together to bring down prey. Sometimes they dogged the flanks of herds of drifting buffaloes, and, natural rovers, no doubt often followed their source of food supply for hundreds of miles. George W. Ruxton tells how a single lobo followed him for days eastward from the Colorado River to get a part of the game he shot each evening. I have heard that in the seventies when the brush country

between the Nueces River and the Rio Grande, in Texas, was cleaned of cattle by trail herds going north and calves born en route were killed on the bedding grounds regularly every morning—because they could not travel with the other cattle—lobos left the region to follow the herds and feast on the freshly-killed calves. But such movements can not be called migrations. However, that lobos did sometimes migrate I am thoroughly convinced —and I have not one guess to explain their migrations.

A frontiersman by the name of J. B. Crocker who contributed some reminiscences to a Texas periodical in 1926 has this testimony to offer: "If my memory serves me correctly, it was in August of 1879 that with two companions I set out from the lower part of Texas on the trail of some cow thieves headed for New Mexico. Traveling in a northwesterly direction, we passed various ranches towards the headwaters of the Nueces and Llano rivers, and wherever we saw a man we heard bitter complaints about the extraordinary depredations being made by lobos at that time. We passed beyond the outposts of the ranching industry and proceeded on across unoccupied territory into the southeastern corner of New Mexico. Naturally we heard nothing of lobos in this region, for there was nobody to hear from.

"About the first of September we turned back. Some two days later, along about five o'clock in the afternoon, we noticed at a great distance (the country being flat and open) what appeared as a mass of living objects moving rapidly and swaying slightly in its course, but coming in our direction. Not one of us could say what the mass was, and it was a full twenty minutes before the objects approached near enough for us to see what they were. Even then we could hardly believe our eyes. What we saw was a pack—a herd—of probably five hundred lobo wolves, traveling due west and moving in solid formation at a steady lope. They passed within fifty yards of us, but paid us no mind.

"This is the only evidence that has ever come to my notice that these animals gathered in large masses to migrate. Yet migrate they did. Upon our return to the ranch settlements the ranchers told us they were having no more trouble with the big wolves; they said that, in fact, the wolves seemed to have left the country. Until we told them, they knew nothing of the wolves having congregated and left in a vast body."

In a book entitled *From Cattle Range to Cotton Patch,* by Don H. Biggers, privately printed about thirty years ago and now practically unprocurable, I find this singular description of a lobo migration quoted from a pioneer cattleman whom the author had interviewed.

"Early one morning about the middle of February, 1880, I was riding along the edge of the Plains a short distance from the caprock, which overlooked a canyon beyond my view. Presently I saw a long string of objects topping out and heading in a northwesterly course across the open plain. Anxious to see what they were, I struck a gallop towards them. To my astonishment, they proved to be gray wolves. It was, of course, impossible for me to get anything approaching an accurate count on them, but they must have numbered several thousand. They were travelling about twenty abreast and the line strung out for several miles. They were moving in a sweeping trot. I rode up to within a few yards of the line and began shooting into them with my pistol, but my presence, the sound of the shots, and the fact that I killed two of them and perhaps wounded others did not produce an observable effect within the ranks. They did not do at all as hungry wolves are supposed to do—stop and devour their slain comrades. While I was shooting, the wolves veered a short distance from me, so that the line made a kind of elbow, but it was not broken and the sweeping trot was not altered.

"On the same day other horsemen northwest of me saw what was evidently the same gigantic pack crossing the Yellowhouse Canyon, still trotting swiftly and keeping a direct course. It is hardly reasonable to suppose that any considerable number of these wolves came from any particular section of the country, many of them very likely having come from ranges a hundred miles and more to the south. If similar bands were ever seen leaving the country, I never heard of it, but I do not recall having seen a single gray wolf on my stretch of the Plains after this migration until 1885, when they began drifting back —presumably from the Indian Territory and the moun-

tains of New Mexico. I suppose that a few were in the country all during these years, but I did not see them or hear of any mischief they were doing.

"Whether these wolves were following the buffaloes, the vast majority of which had been slaughtered, or whether they were directed by some inscrutable instinct is a mystery to me. It is a well-known fact that squirrels and a few other animals not classed as migratory do migrate in large bodies, but the gray wolf prefers to sneak around alone with a select crowd, usually his own family, and this is the first and only instance I know of their having migrated in a large and harmonious body."

How "well known" the facts are about the migrations of squirrels I shall not attempt to say. It is a matter of common knowledge that rodents come and vanish with phenomenal rapidity, but from what I have been able to see and hear, they increase rapidly some years—sometimes over a period of two or three years—because Nature is during the period particularly favorable to them and then die off as rapidly because natural conditions become adverse. Jack-rabbits and wood rats certainly have an irregular diastole and systole of life in this manner.

Yet there have been true migrations of squirrels—and perhaps of rabbits and rats also. In a local volume, *Some History of Van Zandt County* (Texas), by Wentworth Manning (1919) I find the following observations concerning two squirrel migrations through northeast Texas.

"In 1858 came the greatest migration of squirrels that was ever known in this country; from whence they came or whither they went, I know not. They traveled west of southwest; were poor and emaciated. All day long they might be seen like army worms moving on. When they reached the Trinity River, each would get a short stick and, holding it in his mouth, plunge in and swim across—or as far as his strength permitted. Many drowned. A man could have stood on either bank of the river with a club and killed until he sickened, but all the squirrels were too poor to eat.

"In 1872, I believe it was, we had another migration of squirrels, but on this occasion they were not nearly so numerous as before. On the other hand, they were in much better condition. They seemed a determined lot of little creatures, and forged steadily forward in the manner of their predecessors."

The late Charles Goodnight, who established the first ranch in the Texas Panhandle, who laid off more cattle trails than any other cowman the West produced, and who was the most observant frontiersman it has ever been my fortune to meet, told me that he once came upon a horde of prairie dogs migrating.

"It was one early spring," he told me. "We were swimming the Platte River, and when well out in the water I noticed hundreds of prairie dogs trying to cross. The river was half a mile wide and the water was icy cold. I was in the lead of a herd of cattle, and as I passed near one of the prairie dogs he crawled up on my horse behind me. The boys made a pet of him and kept him in the chuck wagon until we turned him loose on the Pecos."

Goodnight seemed to regard the movement he had witnessed as an instance of the prairie dogs' tendency to push in a southeast direction—"never north." Goodnight lived to be ninety-three years old and he spent most of his life looking at Nature in its wild state. He estimated that prairie dogs pushed southward at the rate of about 150 miles in 50 years.

Hunters and ranchmen know that during prolonged drouths deer and wild turkeys have a tendency to scatter and drift. However, I have only one instance of an apparently organized exodus on the part of such game, but I regard the testimony of that instance as impeccable. It comes from John C. Duval, one of the few Texans who escaped from the Mexicans at the Goliad Massacre, in 1836. Duval lived for many years on the frontier; he was an educated gentleman and eventually wrote *Early Times in Texas,* a charming narrative of his adventures and replete with observations on Nature. The migration of wild turkeys he describes was about a hundred miles southwest of San Antonio.

"No fresh Indian sign was seen today, except a few signal smokes a long way off. About noon we halted on the bank of an arroyo for the purpose of grazing our horses for an hour or so. Here we saw a most unusual sight—an immense drove of wild turkeys apparently

"THE COLUMN MADE ITS APPEARANCE ON THE TOP OF A SLIGHT ELEVATION TO OUR LEFT"

emigrating. Our attention was first drawn to them by an incessant noise of clucking and gobbling, and a few moments later the head of the column made its appearance on the top of a slight elevation to our left. The turkeys were coming directly towards us, and very soon we found ourselves surrounded by hundreds. They paid no attention whatsoever to us or to our horses, merely dividing their column to avoid us, as they did when a clump of bushes or any other obstacle stood in their way. They were moving in a southwest direction, and fully ten minutes elapsed before the last stragglers of the drove had passed us.

"A number of coyotes hovered about the flanks and rear of the drove, following it, as we supposed, for the purpose of picking up any that might be accidentally disabled or that might give out on the way. We could easily have killed as many of these turkeys as we wished, but it would have been wanton waste to have done so. We let them pass unmolested. I had heard old frontiersmen say that wild turkeys sometimes emigrated from one section of the country to another in immense droves, but this was the first time anything of the kind came under my own observation."

Naturalists of today, however steadily they may gaze upon the wild life of America, can get only broken peeps at what was once a vast and plain pageant. The testimony of pioneers like John C. Duval suggests habits and movements of the wild that civilization has curbed forever.

One other instance I have of an episodic migration not so remote. Mr. Charles Busey, a resident of Zavala County, Texas, through which runs the Nueces River, told me that about 1920 he witnessed an extraordinary migration of quail. They moved slowly through the brush and across fields, he said, feeding as they went and flying across the Nueces when they reached its banks. He does not know where they gathered or how far they traveled before breaking up. Their course was southwest and they numbered hundreds and thousands. One morning he awoke to find the yard about his country home full of quail. He can offer no explanation of the migration.

Again I can only say that quail, generally very numerous in the brush country, which is still for the most part a ranch country, increase and decrease, depending upon the favorableness and unfavorableness of the seasons; but this is the only knowledge I have of a movement of the birds approaching a migration.

Undoubtedly other records would add to these observations; in fact, a whole literature may exist.

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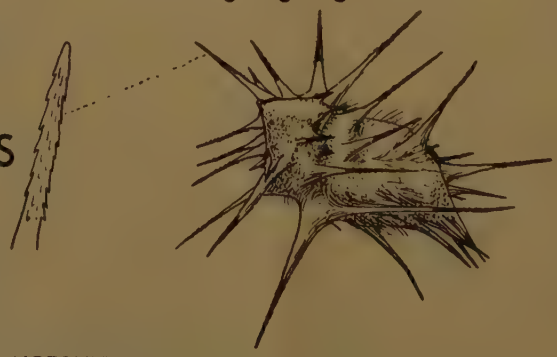
BURS OF SOME COMMON PLANTS

NO. 8—THE HARD-CLINGING SANDBUR

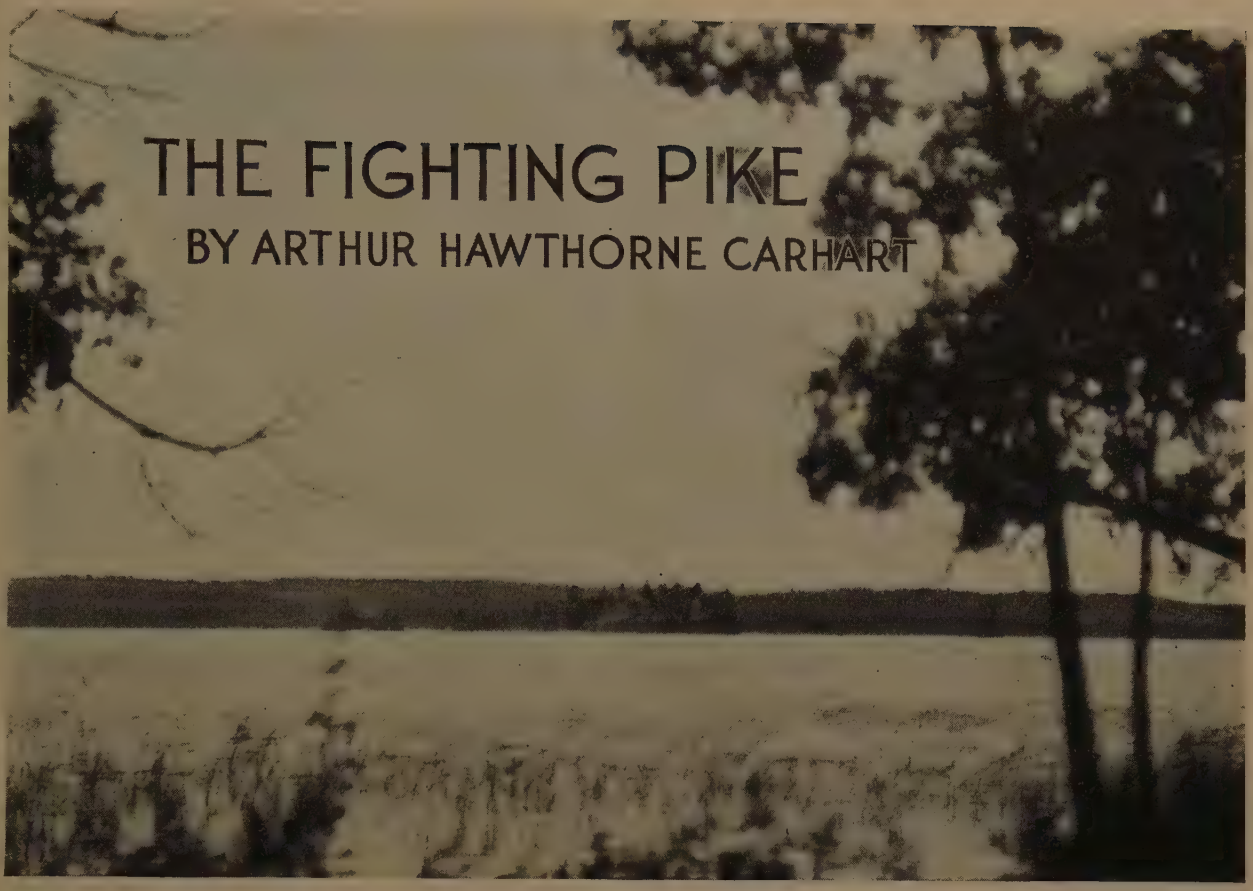
BY S. COMSTOCK-MILLER



NOTCHED SPINES OF THE SANDBUR

The detail drawing shows the crochet-hook appearance. The bur itself is about a quarter of an inch long

SANDBUR, another common bur that returns with you from walks, belongs to the grass family. The burs grow on rather long, stout stems in clusters. The hooks or barbs are not, as in the case of most other burs, formed by curved ends of slender projections, or by backward-pointing barbs on slender spines, but are apparently composed of sharp indentations or notches in the spine itself, after the manner of a steel crochet hook. Such hook-like notches are of course very strong in proportion to their size. The lacerations caused by sandburs sometimes make very bad sores because of the extreme difficulty of extracting these hooks. The spines will sometimes pierce the uppers of shoes. This armament probably protects the otherwise defenseless plant from being devoured by hungry animals.



THE FIGHTING PIKE

BY ARTHUR HAWTHORNE CARHART

He is a desperado. Or he is a notable citizen. Or a nuisance. Or a warrior with a stout heart.

It all depends on with whom you are talking whether the pike is a villain or only a swash-buckling rowdy, ready and prepared to fight for his right to life.

He is related to the trout; can claim, too, that the flying fish is a relative. He is a glutton. He is a great antagonist when hooked on tackle. Some pretend to despise him when he is cooked for food but those who have eaten baked pike ask for no better viand. He is ugly; but built lean and trim like a thoroughbred.

Altogether the common pike and his kin form one of our most interesting fresh water fish families. Certainly no one could accuse Mr. Pike of being lacking in character or courage. To add further interest, he has probably started more arguments among anglers over his name, identification, usefulness and gameness than any other North American game fish.

Even at the risk of a friendly argument, let's talk a bit about the pike and his relatives.

A part of the confusion regarding the pike is due to the various common names given members of his family. A pike may be called a pickerel if he reaches only five pounds, may be acknowledged a pike if he reaches ten, and is almost certain to be misnamed a muskallunge by this same over-enthusiastic angler if he tips the beam at twenty pounds. Again, the same fish, same weight, is often christened different names in different regions. Finally the pike is often confused with the "wall-eye pike". The wall-eye is not a pike at all. He is a pike-perch; has the shape of the pike true enough, but his structure is more that of the perch family. The wall-eye's name is *Stizostedion vitreum,* while the true pikes are all members of the family of *Lucius.*

A fairly simple method of identification of the pike family is by the scale arrangement on the cheeks and opercles or gill covers. Color and marking are other means of identification, but in this family, color, marking and size are not always reliable indices in determining to which species an individual fish may belong. The number of bony rays that support the thin membrane under or behind the jaw is further reliable identification.

There are seven species of *Lucius* found native to North American waters. As a matter of general easy separation, we can divide these into three groups; not on a scientific basis but rather on size and distribution. There are the smaller pikes or pickerels, fairly restricted in range; the common pike which grows to considerable size and has an international range; and the muskallunges that are the giants of the genus and are found in fairly limited waters.

The banded pickerel, *Lucius americanus,* never grows to be much over twelve inches in length. His natural habitat is confined to the Atlantic slope, from southern New England to the Gulf Coast. The cheeks are entirely scaled; so are his gill covers and he has from eleven to thirteen of the bony rays known as branchiostegals. His typical color is sooty green. His sides are definitely marked with about twenty curved blackish bands.

The grass pike, *Lucius vermiculatus,* which has a number of other common names, is a lighter green than the banded pickerel, and the bars on his sides take on the

form of irregular network rather than distinct stripes. Otherwise the distinguishing marks are similar. However, these two species are separated by their geographic range because the grass pike lives west of the Alleghenies. He rarely grows to more than a foot in length in any part of his range.

The common eastern pickerel, green pike or jack fish, *Lucius reticulatus,* has the same scaling as the two foregoing, but his branchiostegals number from fourteen to sixteen. These bony rays are his identifying characteristic. When this fish is full grown he sometimes weighs nearly five pounds. This member of the pike family is found from Maine to Florida and in some of the southern states of the Mississippi Basin.

Those are the pike or pickerel which rarely grow beyond the five-pound limit and are found in fairly well defined geographical regions.

The next species, the common pike, *Lucius lucius,* is distributed all over North America, Europe and Asia and has a host of confusing common names. The Greeks call him *lycus,* referring to his wolfish habits. The German angler calls him "wasserwolf". The American is likely to call him anything hot and handy when a big pike breaks his line, flips his tail and dives for deep water. The five-pound weight limit is surpassed in this species. I know of one fish which set a local record with a weight of forty-seven and one-half pounds while twenty- and thirty-pound specimens are not uncommon in northern waters. The scale pattern changes on this fellow. The opercles are naked and the cheeks fully scaled. This common pike is the one which lends so much confusion to identifying other pike family members because he is similar to the three smaller pikes when small and is often mistaken for a muskallunge when he gets full growth.

The other three species of *Lucius* we find in North American streams and lakes, are the muskallunges. Both the cheeks and opercles of the musky are scaled only on the upper half; the lower half of cheek and gill cover being naked. Another identifying mark is the number of branchiostegals, which number seventeen to nineteen.

The common, or St. Lawrence muskallunge, *Lucius masquinongy,* is grayish, with round or oblong black spots on his side that do not form bands. He is found in the Great Lakes drainage, limited waters in the upper Mississippi Valley and in the Lake-of-the-Woods. He is a giant fresh water fish when he is fully developed, specimens having been reported in excess of eight feet in length.

The Ohio or Chautauqua muskallunge, *Lucius ohioensis,* is a brassy color, with narrow cross shades that sometimes lose their continuity and become spotty. The range of this species is limited to Ohio River drainage, a few lakes in Ohio and Chautauqua Lake, New York.

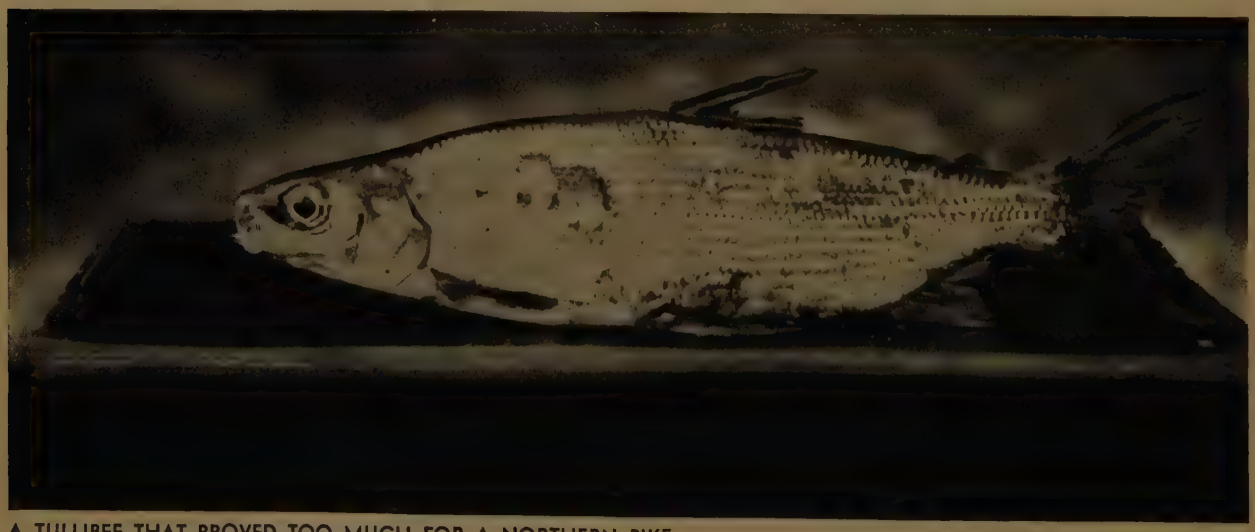
The unspotted or northern muskallunge, *Lucius immaculatus,* is grayish, with indistinct cross shadings. The range is limited to waters in northern Minnesota and Wisconsin.

There is the key to the pike tribe. Simple? Of course. But when you try to apply it to the specimen in the field, you are sometimes in doubt because there are type variations and always those confusing local names to throw you off the trail.

During the past season I fished Basswood Lake on the International Boundary between the Superior National Forest in Minnesota and the Quetico Provincial Park of Ontario. This is the center of population for the big pike and also it is surrounded by waters stocked with musky. In Basswood and all other lakes of the district, there are giant pikes, all called "great northern pike" by local guides and fishermen.

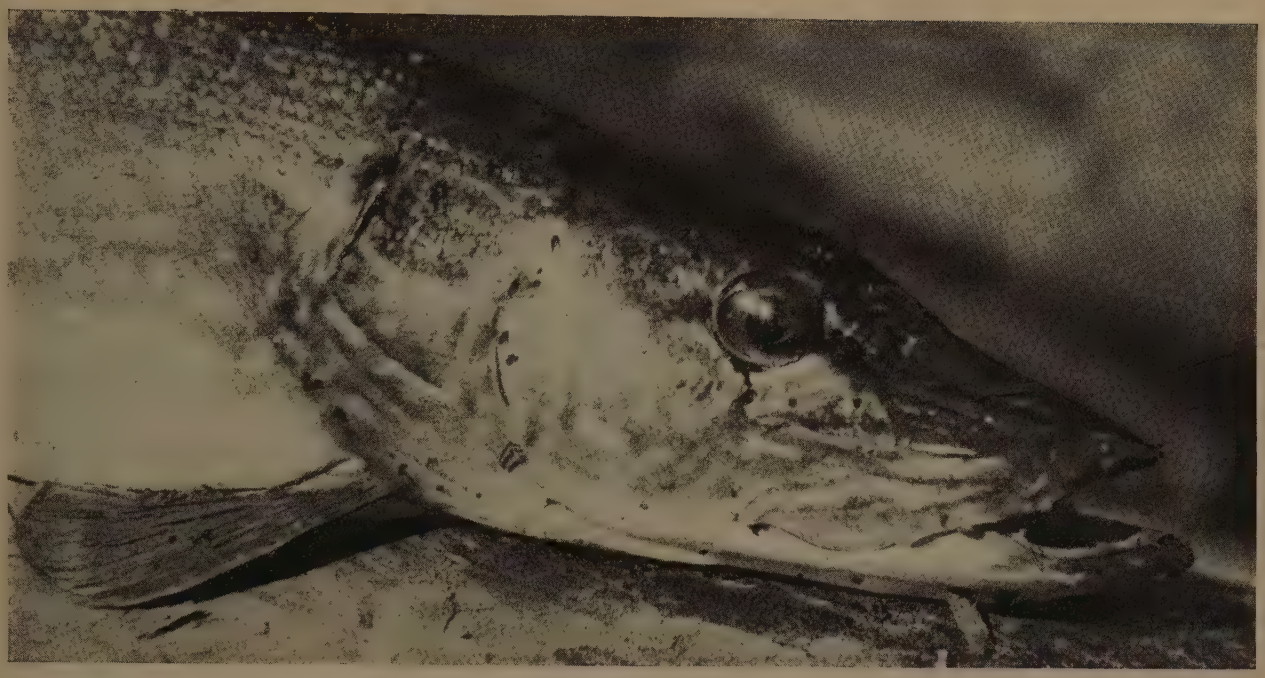
A question was up at once. Was this truly the northern pike or was the name misplaced and the big twenty-, thirty- and forty-pound fish of the pike family that the Basswoodians call "northern" merely a large growing strain of the common pike?

I saw perhaps seventy-five specimens, none of them less than five pounds, most of them ranging from ten to twenty pounds. In some, the scale pattern on cheeks and gill covers were not definite. Color varied too. But we concluded that this was a giant type of *Lucius lucius.*



A TULLIBEE THAT PROVED TOO MUCH FOR A NORTHERN PIKE

One of the water wolves tried to swallow this thirteen-inch fish but couldn't quite make it, the injuries to the victim being visible here, however



THE DISTINCTLY BUSINESS-LIKE HEAD OF THE WATER WOLF

It all depends on with whom you are talking whether the pike is a villain or only a swash-buckling rowdy, ready and prepared to fight for his right to life

No musky ever hit a lure harder than these great pikes of Basswood and surrounding lakes. They dive at any sort of lure. Anything that moves attracts their eyes; invites their attack. One hit my spoon lure, missed, hit again, missed it, gave chase frantically, and as I reeled rapidly, he came to within six feet of the boat, ogled his eyes an instant, and then, with a vicious lunge, he grabbed the lure and dived.

Because he is intermediate in size between the smaller and is a typical pike, and because what is true of his habits and traits is also somewhat true of all other species, we can properly give our attention to this common pike, a warrior with many names and debatable attributes.

This pike feeds on a wide range of prey, including its own offspring. Rats and mice, paddling frantically, will bring the big fellows rushing out of their hiding under lily pads or among reeds. They have been known to grab ducklings and drag them down. Their tendency is to rush and strike at anything that moves. Even though their stomach is full, they will snap at any wobbling thing darting through the water.

It was on an August evening in 1919, while I was camped on Lac la Croix in the Superior National Forest, that I had striking proof of this. Sun was setting. Fish were feeding. I put out in a cranky canoe to test my lures. I popped a red and white plug wobbler over near some reeds and the next minute was fighting a big pike. When I got back to camp I noticed the belly on this fish sagged oddly. That led to investigation. Inside of that twelve-pound pike was a fourteen inch, freshly swallowed wall-eye. The pike had enough food inside of him to last for several days but he struck at the lure nevertheless.

These big pike of the Quetico-Superior country often attempt to swallow fish too big for their throat. Last October, in crossing Conmee Lake, an unmapped eight-mile stretch of waterscape far back in the wilderness on Hunter's Island, we picked up a badly wounded tullibee floating on the surface. It was still alive but could not recover. A big pike had started the tullibee toward supper (for the pike), but had found his prey too wide of beam. It is not uncommon at all to catch a fairly large pike and, while taking the hook from his mouth, discover a fish tail in his throat. The head and body are all the way through the swallowing process but the pike lacks the length required in his tummy to house all the meal of the day!

And yet, in that condition, he hits a lure.

It is this voracious feeding habit which has brought disrepute on the pike. He requires large waters; lakes or rivers where there are rough fish for food in considerable quantities. Put a planting of pike in a small lake filled with blue gills, perch, bass, sunfish, crappies and wall-eyes, and within a few years there will be a small regiment of old stagers, the survivors of the pike brigade, but no other fish in the lake.

Unlike other game fish the pike is not found in rushing waters where he must battle his way up-stream. The usual habitat is in shallow bays, reedy coves and under lily pads. Here is his food supply,—the small fry of wall-eyes, of pike and other larger fish, and tullibees, chubs, shiners, ciscos and fresh water herring. Frogs, ducklings, and perhaps small muskrats are all tit-bits for Old Man Pike. Every hour of the day is lunch time. So he stays close by the pantry.

Here, too, in a shallow mud bottomed cove, is the spawning ground. During other seasons the pike is a lone hunter. But during the spawning time they definitely travel in pairs. A thirty-pound female pike has been known to produce as many as five hundred thousand

NORTHERN PIKE THAT TIPPED THE FISHERMAN'S SCALES AT TEN POUNDS

They are built lean and trim like a thoroughbred and they are real antagonists when hooked on a tackle. Some pretend to despise them for some of their habits

eggs. The eggs are laid in early spring. In from two to four weeks, depending on the temperature of the water, the little fellows are hatched. From that moment life is one risk after another. Only the fact that they are good warriors and that they are produced in the hundreds of thousands, permits the remnant of the hatch to live into the second year. Usually they fall prey to some of the swift flashing dangers that sulk in watery forests of bull rush and lily stem.

It is a sight to see a school of pike fry as it darts over a white sand beach. There are literally tens of thousands of tiny fish, an inch, or two, or three long. With curious army-like precision they wheel, dart, halt or charge, each little fish exactly spaced with reference to his fellows fore, aft, port and starboard. One moves; they all move. And there are so many and so close ranked, they appear as a dark cloud in the water.

The pike is so full of fight and often is so large, the one way to get him safely into a boat is to use a stout steel gaff hook. Plenty of boats have been threatened with upset because a big pike had too much fight left in him even after brought to the boat and gaffed.

One trick I learned on Basswood is worth passing on to other outdoorsmen. If a pike exceeds fifteen pounds the lucky fisherman often wishes to keep him for a trophy. At that size he is good baking too! But if he is from three to twelve or fifteen pounds and the camp is supplied with all the fish needed, good sportsmen prefer to turn back the fish uninjured so he may have another chance. Now a ten-pound pike, with wolf teeth, with raspy gills and a tendency to snap at anything touching his jaws, is a difficult catch to turn loose. Here is how the Basswood guides do it.

The fish is played until fairly tired. He is led to the side of the boat. Part of the time he is thrashing, kicking, diving and plunging. At other moments he rests quietly on the surface rolling his big staring eyes as though he was in a fine temper. In a moment when he is quiet, the guide makes a quick move to clamp finger and thumb on his gill covers. A light pressure is applied. There seems to be an immediate paralysis of the entire fish. So long as the gill covers are held tight, he will not thrash and tumble. While the fish is thus stilled, the guide goes into his mouth with a pair of pinchers and carefully removes the hook. The guide knows how painful and how slow healing are the bites of these fresh water brigands and avoids getting his fingers inside the big, armed mouth. The minute the fish is back in the water, pressure on his gill covers released, he flips his tail and dives for deep water. I have seen this same trick used on large lake trout and on wall-eyes. I have seen fifteen-pound pike lifted and freed by this method. But be sure you keep that hold over the gill covers. If a big pike ever gets loose in the boat you have a threat to equilibrium on your hands. One precaution, wet your hands before you handle live fish. There is a protective coat of gluey substance over many fish and if this is removed by sticking to dry hands, it often allows the fish's body to be attacked by water fungus with dire results.

While these specific traits refer directly to the big pike of the Quetico-Superior country, they indicate the general character of the whole family. Certainly the musky branch is as wolfish, as wild a fighter, as the big pikes. And pound for pound the smaller species are fighters too.

I'm an admirer of the pikes. Reviled by some for cannibalism, condemned for his destructive habits by others, the common pike is a fine game fish. He has the build, the weight and the spirit to fight, and fight, and then start all over again.

A pike by any name still remains a game, ferocious warrior of our lakes and streams, and a worthy foe.

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Arthur Carhart is a landscape architect and engineer by training and a writer by election. He is the author of two novels, many articles and short stories and a recently-published outdoor guidebook to Colorado. He makes his home in Denver when he isn't roaming about in the back country and the high country.

RUS IN URBE

BY SAMUEL SCOVILLE, JR.

ILLUSTRATED BY R. BRUCE HORSFALL

It is not only in the air that we city-dwellers must find our birds. For those who will but look and listen there are bird-sights and songs and even nests to be found beside our city streets. The other evening I was walking along a Philadelphia pavement bordering a row of poplars whose green leaves were just beginning to be flecked with the gold of the first frosts. Westering down the sky sank a crescent new moon with blazing Jupiter pursuing close after. Suddenly from the end of the street came a little wailing call, loveliest and saddest bird-song of any day. I stopped and answered it three times. Then it ceased and as I watched, on silent, muffled wings, a dark form circled just over my head and alighted on a limb so close that I could see the erect ear-tufts of a little screech owl who, with a number of his kin, had moved to the city where he lives for the most part on English sparrows.

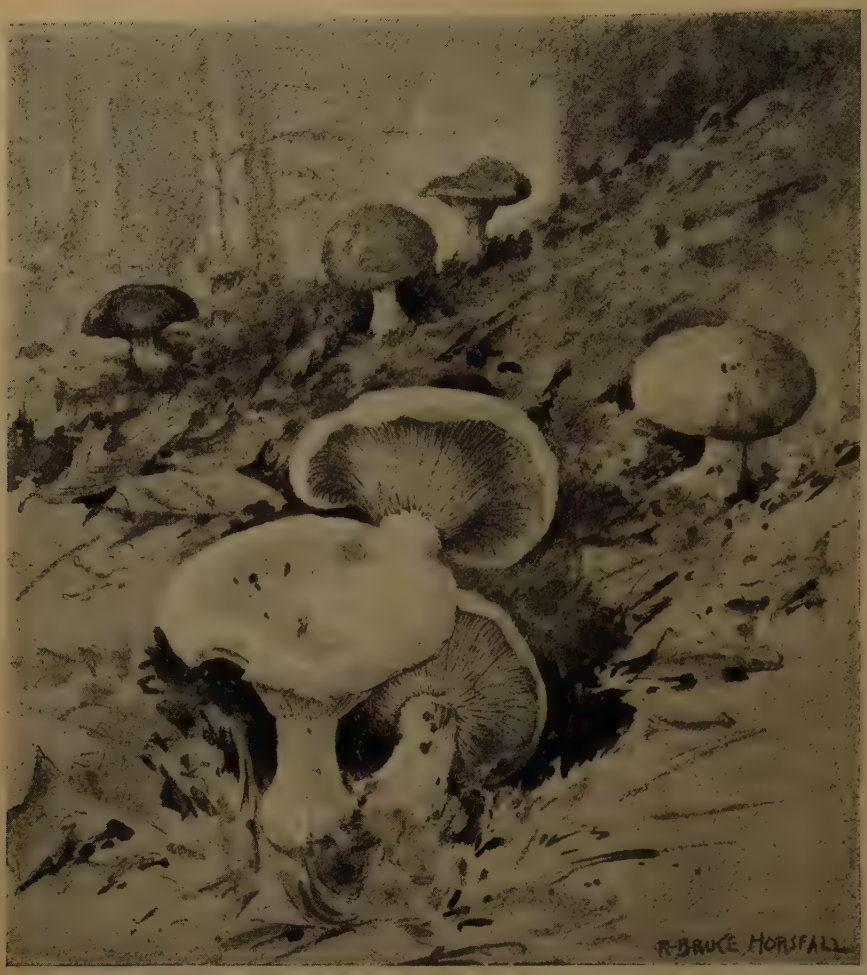
One October night I stayed late at my office. Turning out the lights just before I left, I leaned far out of the open window to look up at the stars. Many feet below me the unsleeping city rumbled and clanked and clanged. Above the clamor, above the skyscrapers, down through the star-shine drifted far-away bird-notes. "Chink, chink, chink," they dropped like silver coins through the still air and I knew that a band of bobolinks were passing overhead on their way south to become rice-birds. The lilt of their bubbling spring-song, which always makes me think of trout brooks, was gone, along with the velvet-black and cream-white of their plumage, but they were the same brave, beautiful birds which I look for every spring. After they had passed I heard a fainter "tseep, tseep," and I recognized the flight notes of the black-poll warblers heartening each other through the dark on their long journey to Brazil.

It was on October 9, 1915, that I first realized what waves of birds pass over Philadelphia every fall. The night before, a heavy fog had hung over the city and the lights on the statue of William Penn had lured hundreds of little birds to their death. Some dashed themselves against the stones, others fluttered around the lights like moths around a candle until they sank exhausted to the ground below. The next morning on a tiny grass-plot in the midst of the court-yard of the City Hall was a group of warblers, hopping about like English sparrows. The two rarest were a bay-breasted warbler, all black, white and chestnut-brown, whose nest I was afterwards to find in the depths of New Brunswick, and a Cape May warbler with his sunshine-yellow underparts streaked with black, and his orange-brown eye-patch and black crown. Besides these were Maryland yellow-throats, with their black masks; black-throated green warblers,

" . . . ALIGHTED ON A LIMB SO CLOSE THAT I COULD SEE THE ERECT EAR-TUFTS OF A LITTLE SCREECH OWL"

with black throats and yellow cheeks; magnolia warblers with ashen heads, yellow breasts and yellow throats; myrtle warblers with white throats and yellow patches on head, wings and rump; black-throated blue warblers in fall plumage but still showing the square white patches on their wings; golden crowned kinglets, the fourth smallest bird in America, and redstarts, all black, white, salmon and orange with fan-shaped tails. Altogether some twenty-one varieties of birds lingered around that grass-plot for two or three days.

It was the head of a noted law-firm in New York City who several years ago showed me that there were other possibilities in a great city beside birds. As we were passing City Hall on the way to the Bridge he suddenly stopped and, in spite of the protests of a policeman, proceeded to fill a large pocket handkerchief with a mass of brick-red fungi which were growing in the grass.



"I TASTED FOR THE FIRST TIME ONE OF THE HYPHOLOMAS, THAT COMMONEST AND LEAST KNOWN OF OUR EDIBLE MUSHROOMS"

From their appearance I should have pronounced them absolutely fatal. That night over a chafing-dish I changed my opinion when I tasted for the first time one of the Hypholomas (I think it was the *perplexum*), that commonest and least known of our edible mushrooms.

Another day on the way back from church in Brooklyn, that same enthusiast showed me, growing under dry leaves on a bit of wasteland next to a livery stable, a colony of pale lilac mushrooms with narrow violet gills. Those "damn purple toadstools", to quote the language of the livery-man, were none other than the celebrated *Tricholoma personatum,* admitted by all mushroom experts to be one of the very best of the edible fungi. Those two experiences made me a mycologist, which means a man who gets up before dawn in the fall to pick mushrooms before his neighbors, and who is constantly causing his family and his cook pain and perturbation by bringing home from the woods all kinds of red, blue, green, and purple mushrooms to be cooked and eaten.

A thousand times and more I had passed by the southwest corner of Thirteenth and Locust Streets in the center of Philadelphia. On the thousandth and first time, which happened to be in the spring, I saw a tree entirely surrounded by pavements, yet towering above the tops of the houses and all feathery green with tiny soft needles. It took me some time to find that it was a bald cypress, a southern tree which, like our northern tamarack, sheds its needles with the coming of frost and stands apparently gaunt and dead all winter. That day, although hemmed in by brick walls and stone curbs, that strange tree in the heart of the city harked back to the days when Thirteenth Street was a cow-path and the cypress was a part of some long-gone garden. I often wonder who the forgotten tree-lover was who planted it. Perhaps he was dear old John Bartram, who brought so many strange trees to Philadelphia and whose garden still stands as a city park, or indeed he might have been Benjamin Franklin himself, another tree-lover, who, speaking from a wide experience, once wrote that the planting of a tree was one of the pleasantest and most profitable occupations of mankind.

One afternoon in late March through an open window a mourning-cloak butterfly flew into my inner office and alighted on my desk. The mourning-cloak has long been one of my special friends. *Vanessa antiopa* is his official name and he wears a wine-red cloak bordered by a line of bright blue spots set in black velvet and edged with cream and lavender. Hibernating through the winter he is often the first butterfly up at the dawn of the year.

The Japanese believe that a butterfly which comes into one's room is a messenger from some friend who has passed beyond. That one, however, was a real butterfly who had flown across hyla-haunted meadows and woods all rose and green and gold with opening leaves to tell me that Spring had come and was waiting.

Another curious Nature-adventure in a large city came to me some years ago as a result of reading that a woman in the southern part of Philadelphia had killed a snake some five feet long in her back-yard. Most snake stories are interesting but almost invariably inaccurate, but I resolved to investigate this one. Boarding a trolley, I found myself in half an hour before a little brick house, one of a hundred, with a back-yard ten by fifteen feet. In a little patch of grass grew a peach tree. The lady who owned the place assured me that she came out there one morning to hang out some clothes and found a monster snake coiling around said peach tree. Thereafter she killed him with that lethal weapon of womankind, a broom, and had him stuffed by a near-by taxidermist as a souvenir of her adventure. As she talked I racked my brain to think what kind of native snake of the length

of five feet would be found in the heart of a great city. When she brought out the stuffed specimen, it was none other than a pine-snake, that huge brown and white reptile of the pine-barrens which hisses loudly but never bites. So far as I know it has never been found in Pennsylvania although fairly plentiful in parts of New Jersey. This one turned out to be a female with eighteen eggs, each one about the size of a bantam's egg.

"ONE AFTERNOON IN LATE MARCH THROUGH AN OPEN WINDOW A MOURNING-CLOAK BUTTERFLY FLEW INTO MY INNER OFFICE"

To this day I have never been able to solve the mystery of the presence of that pine-snake in the heart of Philadelphia.

So everywhere the Wild Folk message us. Through the smoke of the city we can glimpse them and hear their call above the din of our work. It is only our unseeing eyes and our stopped ears which keep us from knowing them and finding them in these surroundings.

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THE TRUCE TREE

BY F. H. CLARIDGE

A WELL beaten path in the hills of Caldwell County, North Carolina, near Setzer's store off from the Blowing Rock-Lenoir highway, leads to a unique tree growth. Scientists speak knowingly of natural grafts and kindred subjects in explaining the peculiar growth of this yellow poplar tree, *Liriodendron tulipifera.* About twenty-five feet from the ground two trunks join together and continue as one larger trunk which goes up until it towers above the surrounding second growth forest. Lumbermen who cut this forest years ago saved this now famous tree on account of its striking characteristics.

Evidence to the contrary, I would rather believe the legend which has grown about its origin, and is believed by the inhabitants of Caldwell County, than to explain its occurrence by scientific deduction. You may take your choice, but here is the legend.

Many years ago two Indian tribes, probably of the Iroquois, were engaging in a sanguinary struggle. The decimation of the two peoples was going on at such a rapid pace that the chiefs and head men of both tribes proposed a truce. They met around the council fire and smoked the pipe of peace. When the terms were agreed upon some tangible sign of good faith was necessary.

Two stalwart braves, one of each tribe, climbed two young tulip trees and bound them together with thongs of deer skin. Thereupon both chiefs swore that never so long as the union of the trees remained should war be declared between their respective tribes. Intervening years are said to have made the union of the trunks complete and the tribes took the warpath no more against each other.

Well, I believe the story and no one can deny, after seeing the tree, that Nature has produced a wonder, whether helped by man or not.

LADY OF THE SNOWS

BY A. BRAZIER HOWELL

ILLUSTRATED BY R. BRUCE HORSFALL

PLACES, like trees, have individuality. Some are inherently friendly—to their friends—and these we wish to visit often as we would a human crony, informally, and make ourselves at home. Others are too full of dignity and aloofness for intimacy, and, although enshrined in our hearts as is an old master in that of an aspiring artist, we would seek them with some air of formality, occasionally, when we ourselves are properly attuned for worship.

Three such places stand out in my cosmos—the Grand Canyon of the Colorado, Crater Lake, and Mount Rainier, my lady of the snows. The first is a land of magnificent distances, to be viewed with proper perspective. In truth I have always regretted that I invaded her privacy by a descent to the river winding through her heart, because I would prefer to treasure her memory as something far distant and unattainable. The beauty of Crater Lake is in its virginal serenity; its chaste, cool dignity; standing aloof as something not of this world. Rainier has its place in my garden of memories for the glory of its snows, and its mightiness, overshadowing the world as one stands in reverence at her feet.

It was July—high springtime in the lofty places—and all the world was a flower garden. Great banks of bloom were among the dells and a riot of color and fragrance was flung over the alpine meadows. One could wander at fancy, knee deep in verdure, startling the jumping mice in the grassy tangles and sending them in hasty flight as they gracefully leaped to safety. One could lie prone in the lushness to examine the intricacy of the highway labyrinths of the mice and puzzle out their small daily doings by the pages of the book that they write as they lead their little lives. One could turn on one's back, hemmed in by the flowery miniature forest, and let thoughts travel as free as the drifting clouds above.

In the aspen thickets were the homes and earthy galleries of mountain beavers—those rodent relicts of a by-gone age—their bouquets of blossoming herbage laid over a root to dry. On the ridges above timberline were the dwellings of the rare little heather mice—true sprites of the skylands—and along the delicious rills from icy springs, the burrows of their big cousins the mountain voles. Or one might loiter, with many a stop to examine the fairy tracery of moss or blossom, over to a distant rock slide to watch and listen to the conies, and the big, grave, hoary, mountain whistlers as they suspiciously eye the intruder of their rocky fastnesses.

And the forests—not dense hordes of trees at this altitude, but clusters, some large, some small, interspersed by single trees. The black hemlocks and alpine firs are to me among the most beautiful of all their tribe. No forest giants are here because winter snows lay a restraining hand on hurried growth, but each tree has something of the charm of the evergreens in an old Japanese print. In spite of medium size they have the dignity of age; the individuality bestowed by irregularity of branch; the reflection of frosty and windy tribulation, and the solemnity of drooping limbs crowded with dark-hued needle growth. Not such as would harmonize with a cheerful, sunny, pastoral scene along a lowland stream, but without a peer in alpine settings. Between them are flowers and heather, and here the grouse delight to feed, sheltered in some measure from cruising goshawks.

Worth while is some rocky seat above one of the great glaciers—not too close but with distance enough to take in its great sweep from up the valley, its cracked, scarred old carcass resting like some monstrous, icy serpent, smudged to earth color along its flanks where the crumblings from the cliffs have lodged. Issuing from its mouth, far below, are the milk-white waters that inevitably flow from the ice rivers. A giant mill, grinding slowly and irresistibly since the world was young. Majestic, yet an insignificant remnant of the glacial hosts that in its middle age mantled all the western mountains.

I like to lie in camp, my back settled comfortably against a tree, and gaze at the Tatoosh Range until I absorb something of the grandeur of its jagged peaks. Gaze but a few moments at the precipices and the sweep of broad ridges and know that these are real mountains—a true cordillera in any other setting. And then one is ripe to face about. Imminent, towering above is the white immensity of The Mountain, dwarfing the Tatoosh into the semblance of an insignificant mole hill. Rise upon rise, ridge upon snowy ridge, she rears her magnificent bulk until her grandeur catches at one's breath.

Through the glasses I can make out the string of dots that were a party of mountain climbers early in the day as they passed near camp. They toil across the glare of a great snow field, to attain by evening the stone cabin at which they will pass the night, continuing in the morning to the summit. Well enough for them if they care to do it, but for me the ascent would verge upon sacrilege. Better for my memories if I remain content at the feet of my snow lady, together with the whistlers, mouse hares and stately hemlocks, drinking in something of the peace of her serenity, worshipping from afar her pristine crown of eternal, heavenly snow.

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THE WHITE FLOWERED, YELLOW-CENTERED DRYADS
The plants grow at high elevations, ranging from Colorado through Wyoming north to Alaska

STRANDED BLOOMS

BY MORTON J. ELROD

THE LOVELY MOUNTAIN PINK
It grows in close mats in high places and is widely distributed

THE vegetation growing on mountain summits has reached its present location and height by following the melting ice. Little by little, as the glaciers receded, the ground was laid bare. From the nearby regions seeds were carried by the wind, or by animals. This process has continued through long periods of time, until grasses, flowers, perhaps low shrubs, have reached the highest and most inhospitable places in the mountains. Plants that have sufficient growing season to flower and mature seeds will be permanent residents; others will not gain footing. Trees are absent, because the season is too short.

Hardy plants, which through centuries have become inured to snow and ice, freezing and thawing, and still retain vitality, are the only ones found in these desolate places. The same species will appear on different summits, separated by wide and deep gorges.

Some species are able to live under very extreme or wide conditions of moisture, heat, and cold. They trail through low elevations, say 4000 feet, to mountain summits of 9000 or 10,000 feet in the temperate zone. The higher plants are smaller or shorter of stem, but otherwise resemble the normal plants of the species.

Of the stranded species two examples are interesting. The carpet pink, *Silene acaulis,* rarely or never grows below 5000 feet elevation. The flowers are a deep pink. The plants grow in dense clumps or mats. Sometimes these mats are a foot or more across. When they grow close together, the effect of the blooming flowers is pronounced. Both plants and flowers are close to the ground. Sometimes they cover an entire hillside of several acres. Then they are startling in their exquisite beauty, and give the mountain floor a glorified appearance. When one sees these beautiful flowers in their native home he may know he is in the Arctic-Alpine zone, where the struggle for existence is great, and where only the hardy can survive. In winter they are buried in snow. On the first exposure to the sun they resume their slow growth, and are in bloom by July. Exclamations of surprise and delight come involuntarily from those who for the first time see the rich color amidst the waste of stones.

The dryad, *Dryas octopetala,* grows only in the Arctic-Alpine zone, usually on the exposed and windswept places. The short and slender flower stems are strong and flexible, and the petals are not easily blown or shaken off. Sometimes when the wind blows so one can face it with difficulty these lovely flowers are bent to the matted leaves, rising again with a lull, swaying back and forth hour after hour, with not a petal lost or a stem broken. The short stems lie prostrate on the ground. The plant is much branched, matted, with thick leaves which stay on the stems and remain green through the long winter. Living at high elevations, rarely below about 5000 feet in northern United States, they are covered with snow for months, reviving with the first exposure to the sun. They are profuse bloomers, the white flowers looking like so many roses in the almost desert waste of rocks and pebbles. Since they belong to the rose family, they may well be and sometimes are called Alpine roses. Flower lovers will be well repaid for a visit to their native home, and will marvel at their beauty and endurance. Such loveliness in the bleak and inhospitable places in which they live reveals the charm which the mountains present.

FISH THAT GLITTER

BY BEN HUR LAMPMAN

ILLUSTRATION BY R. BRUCE HORSFALL

GOLDFISH, so it is said, were not originally auriferous. In those Asian ponds where their progenitors swam wild, as a sort of diminutive carp, the fashion for a thousand seasons had been one of dark scales with just a glint of green in them. They were heron food, those primitive goldfish, and never dreamed of transformation into glorified monstrosities, with bowls and ponds of their own, where never a heron might wade. But the Chinese, with their penchant for pets, discovered that by artificial selection and culture the hint of olive on the flanks of these small cousins of the carp might be translated into golden scales. So we began to call them goldfish, and certainly they are golden enough.

There are many stories about the carp, bits of myth and legend and the like, in both Chinese and Japanese literature. Thus the Chinese call all carp the "messenger fish," and the story runs back almost to the throne of Genghis Khan, with its lacquered dragons snarling at one another. To dally with political causes in those times frequently led to the loss of one's head, so you may be very sure that when conspirators had a message to send they were extremely careful as to the means. During the reign of a certain emperor, renowned for his impatience with mandarins who did not conform to his political views, a clever conspirator hit upon the device of stuffing his secret letters down the throat of a fat carp, and sending the fish away as a present. So the carp came to be called the "messenger fish," from his constrained participation in ancient Chinese intrigue. But there is a dearth of such tales about goldfish. The goldfish merely swam round and round his bowl, or rose for a bug by the lily-pads, brightly, lazily, touched of old King Midas.

There isn't anything more helplessly dependent than a goldfish in a bowl, unless it is a proud lady in a limousine. The poor fish hasn't anything to do save to glitter, and, as Irv Cobb once observed, is wholly without privacy. But it is quite different with goldfish in fish ponds, even if those ponds are little ones in gardens. Gone is the lethargy which characterizes the captive of the bowl, and our fine fingerling comports himself with splendid energy, darting actively hither and yon, boring and mumbling at the sediment like any carp, plainly enchanted by the diversion of earning his own living. If there are no more than several goldfish in a little pond it were mistaken kindness to bring them food. Wee insects are trapped on the surface, and mosquitoes aspire to make the pond their nursery, and these to the fortunate goldfish are the gifts of the high gods. And if, so it is said, there grows in that pond a water lily, or other water plant, very presently the goldfish will have coined other goldfishes, hundreds upon hundreds, to prove that Nature and they are well pleased with the concrete home.

There is this curious fact about goldfish. If they are returned to open waters, as they have been in some of our eastern rivers, within a few seasons they become—their progeny, of course—the dark, olivaceous fish of Asian streams and ponds. Their triple tails, their bulging eyes, all the exterior evidences of culture, quite disappear. For them civilization has broken down and they are wild again. You may make one or a dozen lessons of this, as may please you most. But perhaps the best one is that which we invoke each year as we seek for a period the healing wildness of Nature, because then we, too, change.

JEWELRY FASHIONED WITH OPALS
And the superstition that it is unlucky is as absurd as the powers ancients gave it

TOURMALINE IS A VERSATILE GEM
Its ranges of color lend it to use in ornaments of wide variety and outstanding charm

THE MONTH OF OPAL AND TOURMALINE

BY AUGUST POHNDORF, JR.

The tenth of the series of articles on birthstones by the Colorado gem expert. In November, Mr. Pohndorf will discuss the topaz.

OCTOBER, seemingly not content with possessing the varied shades that Jack Frost paints, has taken to herself two of the most colorful of gems—the opal, beautiful as a rainbow, with elusive flashes of color that are never still, and the tourmaline, that mocks the emerald with its green, the peridot with its yellow and the ruby with its red, and still has a hundred shades left.

Pliny wrote of the opals, "For in them you shall see the burning fire of the carbuncle, the glorious color of the amethyst, the sea green of the emerald, all glittering together in an incredible mixture of light." Nor does science take away the glamour of these gems by stating that they are solidified silica jelly, and that the fire and flash we see is caused by an infinite number of inconceivably small water-filled fissures and cracks in them. They contain from three to five per cent of water. The ground color through which these chromatic disturbances play may be milky white, pinkish- or bluish-white, blue, black or colorless. The luster is so characteristic as to give rise to the term, "opalescent". The stones may be transparent, translucent or nearly opaque.

Opals range in hardness from 5½ to 6¼ and average about 2.15 times the weight of water. They are not especially brilliant, their index of refraction being only 1.45, and when for any reason the water in them dries out or is lost they become dull, opaque and lifeless.

They are of frequent occurrence in many parts of the world, but the gem varieties are rather rare. The chief localities for the best stones are Hungary—where the earliest mines were—Australia, Honduras, Mexico and the State of Nevada. Of the many varieties, some of the most important are the precious opal, which displays the finest opalescence; black opal, with its dark background or texture; harlequin, with its pleasing play of color on a reddish or orange background; fire, consisting of the high yellow, orange and red with an inner glow; girasol, a blue-white translucent type with a marked reddish highlight which is revealed under strong illumination, and dendritic opal, the opaque milky variety that shows black, mossy lines.

Opals vary widely in price. From the common opal which has no value we may ascend the scale to the very fine "black opals", exceptionally fine specimens of which may cost as much as one thousand dollars. Austrian opals are worth about ten dollars a carat, while the Australian "blacks" bring between twenty-five to fifty dollars a carat for good stones. The common practice is to cut the fine black opal into thin sheets and cement these on material of the same texture but less fine. This is the usual opal "doublet", which is worth from five to ten dollars a carat. Fine Mexican "fire opals" may be had for five or ten dollars each.

In early times, the opal was of great repute as a cure for eye troubles, and was supposed to partake of the virtues of all the stones the colors of which it showed. It activated the heart, preserved from infection, cleansed and sweetened noxious airs, prevented swooning, relieved dejection, and implanted hope. It was supposed to wax or wane in luster as the wearer enjoyed perfect health or became ill. The modern superstition that this gem is unlucky is as absurd as some of its ancient counterparts. Surely the late Queen Victoria would not have given each of her daughters a fine opal on their marriage day had the

tradition a basis in fact rather than in superstitious fancy.

The tourmaline group presents one of the most interesting family of stones in the lapidary's catalogue. Its members rival the oils on an artist's palette in shades and colors, and have every hue that the other precious stones can muster.

If your memory reaches into those dim days when, on occasion, liqueurs of different colors and densities were carefully poured into tall glasses, you may remember how those sharply divided colors looking out through crystal glass made beautiful and striking pictures (some people even drank these pictures, with more striking results, so I understand). Many tourmalines convey the same effects —the crystals may be red or pink on top, then white or yellowish below, then blue or bluish-green. These color zones are sharply defined and rarely show a belt of intermixed shades between. Other stones may have a green core, then a colorless belt, then on the outside of the crystal a circlet of red, and still others may substitute all the colors of the rainbow for the patterns mentioned above. There is no end to their variety and their beauty.

To analyse tourmalines would be to give a course in inorganic chemistry, so suffice it to say that they are complex silicates of aluminum and boron, and that the various hues are caused by iron, manganese, chromium and lithium, worked in by an Artist who uses the world for his palette, and volcanic fires for his palette knife. Some of the best known varieties are the colorless Achroite, indigo-blue Indicolite, ruby Rubellite, Brazilian Emerald, Ceylon Chrysolite, a yellow-green, and the fine rose tourmaline, Siberian Ruby.

Tourmaline is vitreous in luster, and varies between clear transparency and opaqueness. It has a hardness of 7 and a specific gravity, compared to water, of 3.1. It is of the same brilliancy as aquamarine, with a moderately strong double refraction. When heated, it becomes electric, attracting small bits of paper and lint. It is found in several states and Canadian provinces in North America, Brazil, Burma, Ceylon, India, the Isle of Elba, and Russia. A gem of fine colors ranges in price from three dollars and fifty cents to fifteen dollars a carat.

Colorful October—no gems in the diadems of all the kings are more radiant and various in their hues than those dedicated to her—colorful opals and the tourmaline!

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A DOUBLE TRAGEDY

BY W. S. LADD

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TRAGEDIES in Nature take place more frequently than we often realize, because it is the rule of Nature that all organisms can survive only at the expense of others. Naturally it is usual that the one attacked is the only victim, but more rarely the assailant also may meet his end. Here is the story of such a case. One day in the last week of April we were preparing lunch in the kitchen. Suddenly, there was a great commotion among the birds outside. We glanced up and out the window just as a dark form on the wing dashed by. Later we investigated.

Near the corner of the house is a small apple tree and rising from the ground about it are numerous shrubs. In the fork of one of these was hanging by the neck a dead robin. On the ground between the robin and the tree lay a female sharpshinned hawk, also dead. Both birds were still warm, and an examination showed that in each case the neck was broken. Of course we were interested and tried to reconstruct the tragedy. Seemingly the robin had dashed into the leafless thicket with the hawk in hot pursuit. Perhaps the smaller bird in its desperate haste to escape dashed into the fork of the bush, hanging itself and breaking its neck. Or perhaps it had been struck by the hawk and in falling happened to catch there. How was the hawk killed? Did a branch of a shrub break its neck or did it dash head-long into the tree because of its attention to its prey and fall in the position in which it was found? The hawk lay breast down pointing toward the tree, and the possibility first mentioned seems the more likely. At any rate, since the robin was killed, one cannot help feeling a sort of satisfaction that the aggressor met a similar fate.

In the April issue of Nature Magazine we printed the first part of a special color feature entitled "Birds of the States". This consists of a story about the selection of State Birds written by Katherine B. Tippetts, Chairman, Division of Conservation, General Federation of Women's Clubs, and thirty colored pictures with descriptive text. Mrs. Tippetts has been in large measure responsible for the almost nation-wide action thus far taken.

The pictures on the four pages that follow this one are twelve more in this series, and an additional twelve will be published in the December issue. The entire feature, however, is available in a sixteen-page booklet the size of a Nature Magazine page, and further information about this booklet is to be found on the inside back cover of this issue of Nature Magazine. It is a valuable, useful and unique piece of bird literature.

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BIRDS OF THE STATES

FOUR STATES STILL LACK OFFICIAL AVIAN EMBLEMS

BY RICHARD W. WESTWOOD

ALTHOUGH four States—Connecticut, Indiana, Iowa and New Jersey—still have not officially designated a bird that is to stand as its official avian emblem, indications are that both Iowa and Indiana will soon take definite action. Out where the tall corn grows the goldfinch and the dickcissel appear to be sharing popular favor, while down where the Wabash flows the cardinal is now in the forefront.

DICKCISSEL, A FAVORITE IN IOWA

Urged by many for selection as the official State bird. Others favor the goldfinch, Minnesota's emblem

While the selection of an official State Bird, whether by popular vote or by legislative action, is not an act upon which hangs the fate of nations, it does have important phases. Interest in and protection of bird life were never more needed, and one of the greatest services rendered by campaigns for an avian emblem is through the attention and study given to birds and their habits. The really valuable selection is one that results from widespread popular discussion and expression of opinion.

In the majority of cases the birds selected have been chosen for their value as insect-eaters, or for their beauty and charm of song and color. Almost without exception there has been a substantial reason for the choice of one bird as distinguished from another, and, in the process, much that is of permanent educational value has taken place. Perhaps the only criticism of the list of State Birds now recognized by forty-four states and the District of Columbia lies in the fact that there are several instances of duplication or multiple selection of the same bird.

In this respect Indiana is facing a problem. The Indiana Audubon Society has endorsed the cardinal, and this excellent and active organization is likely to have its wishes carried into effect. However, it is pointed out that Delaware, Illinois and Kentucky have already pledged allegiance to the red-coated songster. It is a typical bird of the Hoosier State, to be sure, and it must be left to Indianians to decide whether or not they wish to be different.

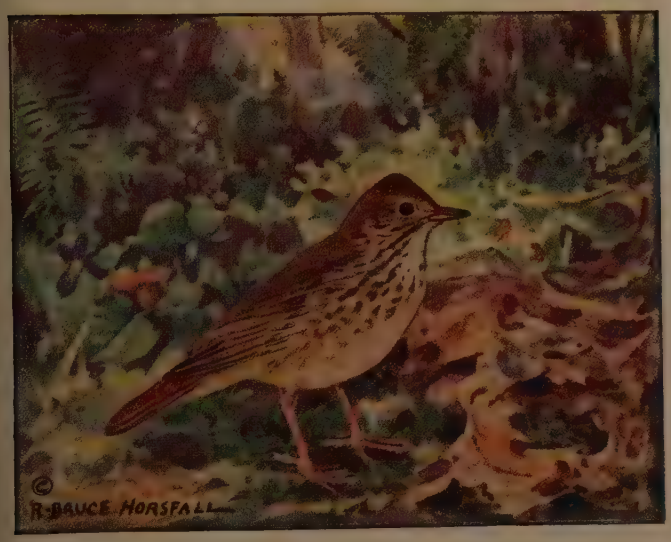
In Iowa the goldfinch is much favored, but the supporters of the dickcissel, whose distinctive call is known to so many Iowans, argue that the goldfinch is already the State bird of Minnesota, and point out the willow goldfinch the selection of Washington. The dickcissel has not yet been recognized by any State.

In Connecticut and New Jersey there seems to be notable inertia about campaigning for official birds. It is to be hoped that the head of the school system in each of these states will see the opportunity offered and conduct a thorough vote through the schools. NATURE MAGAZINE knows from experience gained through the conduct of its vote for a National Flower how eagerly such a question is seized upon by the school children, how carefully opinions are reached and how worthwhile is the study.

IDAHO AND NEVADA

Mountain Bluebird is State Bird for Idaho and Nevada. As its name implies, this is a bird of the higher altitudes of the western interior from northern Alberta to New Mexico and from the Plains to the Pacific. It nests abundantly about ranch buildings, in fence posts and in tree cavities which may have been previously used by woodpeckers. Five to seven pale greenish eggs nestle in the lining of soft grasses. Injurious insects comprise about eighty-five per cent of the food used by this species, the remaining fifteen per cent being wild fruit or waste of trees and vines. While hunting in the open fields, it poises on hovering wings to pounce upon its food, or from a convenient perch it drops upon grasshoppers, crickets, small flies, weevils, cutworms and ants. In common with its eastern cousin, it gathers in small family flocks to travel and hunt, exchanging melodious calls and songs as they go. A flock in vivid blue seen against the snow of high mountains or against the dry September landscape of the rim-rocks, make pictures long to be remembered. In habits and song as well as in color, they are true bluebirds.

Mountain Bluebird—*Sialia currucoides*



Hermit Thrush—*Hylocichla guttata foxoni*

VERMONT

Hermit Thrush, sweet singer of woodland solitudes, is State Bird of Vermont. In nesting time it remains in seclusion, but during migration and in the winter months it stops momentarily in hedgerows and in trees, and sings a sibilant, melodious, though fragmentary, song. A fortunate few have been lucky enough to hear it sing its eerie, plaintive song in its summer home. Its habit of twitching its bright, russet-colored tail as it alights upon a branch, either in the open or in the twilight of deep woods, is distinctive and an excellent mark of identification. The Vermont hermit breeds from north central Canada to Minnesota and northern Michigan, and in the mountains of Pennsylvania and Maryland and winters from the Delaware and Ohio valleys to the Gulf coast and West Indies. Its nest is placed upon the ground in the shelter of an overhanging root or other protection and is made of leaves, mosses and coarse grass, lined with fine roots. The three or four eggs are pale greenish blue. The care of the home is shared equally by both of the parent birds. The food of this thrush consists of insects and wild fruit.

SOUTH CAROLINA

The Carolina wren is State Bird of South Carolina. Because it is usually a resident wherever it occurs, this wren is one of the best known throughout its range. It breeds from the western plains to the Atlantic, from the Gulf to Ohio, southern New York and Connecticut. Its choice of nest site varies from some sheltered crevice in a woodland rockery or fallen tree within sound of a bubbling brook, to an equally sheltered nook about farm buildings. Three to six eggs are wreathed about the larger end with thick brown etchings. The musical song and whistled notes of these birds may be heard throughout the entire year. Such a medley of sounds! some gay, some harsh, some mocking. All so much louder than one would expect from a bird his size. The quality of some of his calls is so like that of the cardinal or tufted titmouse as to confuse the novice. He delights to show off, with constant twitching of tail and flying from place to place; either as a bid for admiration or to distract attention from his nest and the treasure it holds. His food is insects, their eggs and larvae found on or near the ground.

Carolina Wren—*Thryothorus ludovicianus ludovicianus*

BROWN THRASHER—*Toxostoma rufum*

GEORGIA

Brown Thrasher is State Bird of Georgia. Groves, hedgerows, upland meadows or swamps may be the haunts chosen by the brown thrasher who places his nest near the ground, or even upon it in a dry upland thicket. He is a valiant defender of his right to seclusion and wise birds keep at a safe distance when he is angry. But his rich, full-toned evening and morning song he shares with all from the highest branch to be found in his vicinity. There are no black marks against him in the matter of his food habits, for all day long he forages for bugs, beetles, caterpillars and the like in the undergrowth and on the ground beneath. Probably the thrashing motion of his long tail while thus engaged may be responsible for his name. His breeding range includes the country from the base of the Rocky Mountains throughout the eastern part of the United States, and he spends the winter months in the southern states. Because of his beautiful song and dark marks on his breast, he is sometimes wrongfully called brown thrush. He is really classed with those inimitable mimics the mocker and catbird.

DELAWARE, ILLINOIS, KENTUCKY

Cardinal is State Bird of Delaware, Illinois, and Kentucky. A full clear whistle resounding through the frosty air of a winter day, a flash of brilliant red against the snow-covered landscape, proclaims the presence of cardinal grosbeak who stays the year round in the land of his choice. He is an ideal spouse, guarding the nest during the absence of his mate, carrying food for the young and finally taking over their entire care when they leave the cradle. Meanwhile his mate builds a second nest in a vine or bramble bush. It is loosely-built of twigs, grass stems and strips of bark. Here another set of three or four speckled eggs is incubated. All this time the male bird keeps up his cheerful song and watchful solicitude for his family. He also serves the community well by destroying some of its most injurious pests —potato beetles, rose chafers, scale insects, boll weevils. During the winter months he ekes out his livelihood with buds and weed seeds. He is particularly grateful for sunflower seeds and other food placed on feeding trays. He lives from the Gulf States north to Minnesota and east to Boston.

CARDINAL—*Richmondena cardinalis cardinalis*

FLICKER—*Colaptes auratus auratus*

ALABAMA

Yellow hammer, the flicker, is the State Bird of Alabama. These golden-winged woodpeckers are resident throughout eastern North America. Only those of the north move south during the winter months. They are usually numerous and exceedingly useful in the destruction of ants, cutworms and other insect larvae. These they spear with long, hairy, barbed tongues. They commonly feed on the ground though they do good service in trees as well. Both birds chisel the nest hole with their long strong beaks, throwing out the chips, except a few left for lining, and both share in the incubation of the five to nine white eggs and in feeding the young. Their flight is undulating and they differ from most woodpeckers by sometimes perching across a limb. One of their calls is a rapid repetition of their name, flicker. They also delight in beating a tattoo on rain pipes or hollow limbs, seemingly as a means of communication or entertainment. This habit has given them one of their common names, yellow-hammer. Both birds have white rump and red on back of neck. The male wears black moustache on cheeks.

DISTRICT OF COLUMBIA

Wood Thrush is the official bird of the District of Columbia. It is a native of woodlands but has learned to be at home in shaded city parks, or on shrub-bordered lawns. His song has served as the theme for many a gem of literature, and he still delivers it with undiminished charm and sweetness. In the early dawn he welcomes a new day and invites you to join him in the grove. There, usually above one's reach in the crotch of a sapling, may be found a nest woven of rootlets, weed-stems and twigs cemented to the softer lining with a layer of mud. The three to five eggs will be light greenish-blue. The brown back of the wood thrush blends with the leaves among which he finds cutworms, beetles, caterpillars and ants. When the fruit of spice bush, viburnum, or wild cherries are ripe, he adds them to his fare. Wood Thrush is the largest of the family, Turdidae, with spotted breast feathers. He summers in eastern North America west to the prairie region and winters in Mexico and Central America, and occasionally in Florida, sometimes migrates by way of Bahamas, Cuba and Jamaica.

Wood Thrush—*Hylocichla mustelina*

House Wren—*Troglodytes aëdon*

OHIO

House Wren is State Bird of Ohio. Year after year Jenny Wren returns to the house of her choice, be it a bird box in the apple tree, a cranny in the wall, or the pocket of the perennial scarecrow. Spring housecleaning over, she and her mate proceed to fill all available space with twigs. Somewhere within they place a lining of soft grasses, webs and feathers. Here six to ten profusely freckled eggs are laid. While Jenny is incubating, her mate perches near by, untiringly bubbling his sweet song. After the young are hatched there is little rest for either of them. Caterpillars, beetles, bugs and spiders must be supplied in astonishing numbers all the time, until the youthful wrens are ready to help in the hunt. During the nest building time wrens are jealous of their chosen hunting grounds and are known to sometimes destroy nests of other box-nesting species while protecting their home territory. When the wrens seek their winter homes in the south there are more birds than houses and they become known as wood wrens because they must find shelter in holes and crannies in the trees of the forests.

KANSAS, MONTANA, NEBRASKA, NORTH DAKOTA OREGON, SOUTH DAKOTA, WYOMING

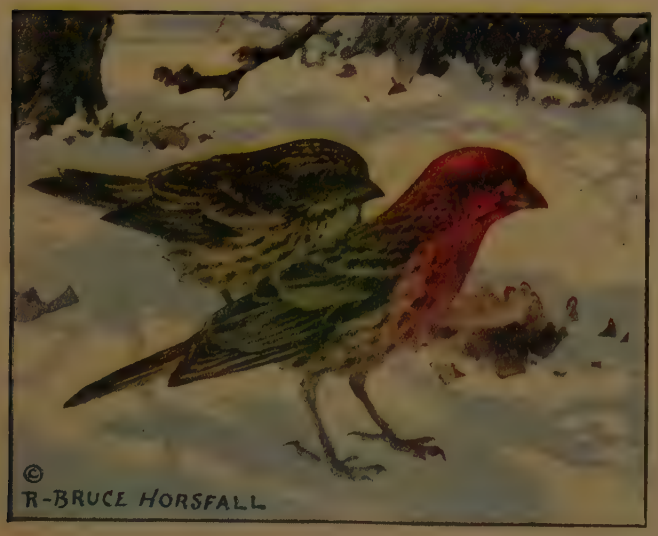
Western Meadow Lark is State Bird of these seven states. Wherever, west of the Mississippi River, open uplands exist, there will be heard the pure, clear tones of the varied song of the western meadowlark as he poises in mid-air or perches on fence post, telephone pole, or perhaps selects the highest tree in the neighborhood. The meadowlark is a ground nesting bird, his roofed-over home will be hidden in some grass clump and have a long entering runway. The food of the six or seven babies consists of grubs, cutworms, grasshoppers and crickets. The meadowlark is a permanent resident except in the northern part of his range, because he is able to find sufficient food for his needs and does not mind the cold. He may be easily identified by the long bill, black collar on yellow breast, and the white outer tail-feathers which are noticeable in flight. He is a plump bird and his relatively short tail emphasizes this fact.

Western Meadowlark—*Sturnella neglecta*

BLACK-CAPPED CHICKADEE—*Penthestes atricapillus atricapillus*

WASHINGTON

Willow Goldfinch is State Bird of Washington. It is quite similar to its eastern cousin but is a distinct species with wings and tail shorter and coloring not quite so bright. It inhabits the Pacific coast region from Washington to Lower California. These goldfinches are fond of willows for homes. The nest is a beautifully constructed cup of plant fibers lined with felted willow down, often placed in a willow tree not far from the ground. Other birds select sites in rather tall woodland trees. Three to five bluish-white eggs are laid. The young learn early to care for themselves and may be seen perched upon thistle heads eating the seeds. At the close of the summer season the males become similar in coloring to the females and young birds. They remain throughout the winter, but are often not recognized, as they busy themselves among the seed-heads of dried plants. They do an immeasurable amount of good to the agriculturalist by lessening the crop of pestiferous weeds. Fallow fields are particularly benefited by the coming of a flock of these beautiful native finches, the western wild canary. Luckily they are abundant.



PURPLE FINCH—*Carpodacus purpureus purpureus*

MAINE

The Black-capped Chickadee is State Bird for Maine. These chickadees are permanently at home in woodlands from northeastern Canada and Newfoundland to just beyond the Mississippi in central United States; following the evergreen forests south along the mountains as far as North Carolina. They are of inestimable value in destroying eggs and larvae of moths and weevils, especially the tent caterpillars and gypsy moths. Small seeds and a little fruit are relished as well. They are cheery visitors to our feeding trays, trustful, friendly fellows to meet on walks through the woods, ever ready to answer and investigate an imitation of their calls. A common habit of chickadees is to hang upsidedown while feeding or drinking sap at the broken ends of maple branches. The large family is raised from four to nine brown-spotted eggs laid in a cavity, either natural or a woodpecker's deserted nest which has been reconditioned with grasses, moss and leaves, softly lined with hair and feathers. Such holes are quarters where the tiny mites are warm even in the severest winter weather.

WILLOW GOLDFINCH—*Spinus tristis salicamans*

NEW HAMPSHIRE

The purple Finch is State Bird of New Hampshire. These are birds of northern America, breeding from British Columbia eastward through Canada and Newfoundland south into the United States in North Dakota, eastwardly in approximately the same latitude, across Long Island; and winter throughout their United States habitat south to the Gulf coast from Florida to Texas. They choose nesting sites in trees of gardens and forests. About homes they build in evergreen trees from five to thirty feet from the ground. The nests are trim structures of rootlets, twigs, grasses and long hair, the latter used as a cleverly woven lining. During the time of construction the male birds merit the local name of "warbling finch" as they bubble over with sweet toned songs, sometimes uttered as they fly up into the air. The blue eggs, blotched with brown at the large end, number four to six. These finches are often seen in flocks, feeding upon seeds of weed and tree. Ragweed and tulip tree seeds are favorites. They have been wrongfully accused of doing much damage by eating buds of fruit and shade trees.

THE HYBRID ROSE, "LEONARD BARRON"

To attain this a wild rose from the Arctic Zone was crossed with that old favorite, Paul Neyron, and a yellow hybrid tea, to produce a rose of extreme hardiness

A ROSE WHICH SHOWS THE WAY

This beauty of the rose garden was originated by the Conard-Pyle Company of West Grove, Pa., and is a striking coppery salmon color splashed with burnt orange

ADVENTURES WITH SEEDS

BY ROMAINE B. WARE

ONLY a package of seeds and still within its narrow confines there repose untold delightful miracles. As boys and girls we learned that seeds contained not only an embryo, which is the coming plant, but also a storehouse of food to use when growth starts and until the plant's own roots and foliage assume the task. The super-high-power microscopes of modern science now tell us that within the reproductive cells, there are tiny structures known as chromosomes. With roses these are present in groups and multiples of seven. These chromosomes are said to contain the hundreds of factors which contribute the heredity of offspring. It is a highly technical task to study this phase of plant genetics but science offers it as an explanation of why there is such a wide diversity in results from seed.

He who has had the pleasure of adventuring with seeds soon discovers the wide dissimilarity of plants even coming from the same seed pod. They vary in height, color, habit of growth and numerous other details. This variation results in countless thousands of varieties. It accounts, also, for innumerable natural hybrids found all over the world. Not only does this discovery of chromosomes seem to be an explanation of these hybrids but it opens a vast field for research and experiment. Plant breeding, frequently spoken of as hybridizing, has only been engaged in systematically since about the beginning of the last century, and since then Darwin, Mendel, De Vries and others have discovered and expounded theories, principles and laws, some highly controversial but all stimulating the increasingly popular avocation of plant breeding.

Hybridizing—crossing species or varieties by pollination and raising new varieties from seed—has recently become widespread both among commercial growers and amateurs. Literally millions of seedlings are raised each year, and, while but a small percentage of them prove worth propagating, many truly wonderful varieties have been developed.

We cannot all be Burbanks and devote our lives to the creation of spineless cactuses and other plant marvels, but all over the country there are hundreds of plantsmen, both amateur and professional, annually working mira-

BULBOUS IRIS, "HOLLANDIA TYPE"

With some protection they are hardy as far north as New York City. Note the vast difference between this and the new variety, "Golden Lion", on the next page. Below is the hybrid peony, "Chalice", obtained by Professor A. P. Saunders by crossing P. sinensis with P. macrophylla. The possibilities are unlimited

cles with seeds. The ever-present creative instinct goads them onward. Not only do they work with a variety of garden flowers but also with bulbs and shrubs, and some are even experimenting with trees. Garden hobbyists in the Old Country have long been delving in this interesting field and many new and different plants and flowers have been the product of their efforts.

Dahlias are typical examples of what may be done by plant breeders. We are all familiar with present day dahlias of marvelous size and quality but until we compare them with those of a score or more years ago the great difference is not appreciated. Not only have the commercial growers developed new varieties but thousands of backyard enthusiasts are planting seed and enjoying real thrills as "new" creations blossom forth. We cannot all produce quality varieties like the new American Legion dahlia, but there is always that gambling possibility. This glorious bright yellow dahlia was a 1931 sensation grown from seed by a South Jersey fancier.

In contrast to dahlias, which may be produced and propagated with great rapidity, peonies are much slower. Seed gathered and planted in the fall will sometimes germinate the following spring but frequently lies in the ground a year, often two or more. Then it is usually three to five years before the plants bloom, and, in addition, there must be a similar period of testing on different types of soil before decisions can be made as to the practical value of new varieties. Even after all this, there is only about one chance in several thousand that you will obtain a variety as good or better than existing kinds. An extensive breeder of fine peonies in the middle West has, during the past thirty years, raised several million seedlings and out of the entire lot produced only about fifty varieties worth propagating and introducing. Some of these, however, are among the world's finest.

Lure of adventure with seeds urges the plant breeder onward. Always he is working and hoping for a radical improvement over existing varieties. For years delphinium growers worked to secure a white variety as perfect in quality as the good blues. At last it was accomplished and our gardens can now enjoy them. Blue roses, bright red iris, yellow peonies, red delphiniums are among the sought-for flowers. Burbank, often called the "plant wizard", did marvelous things by cross-breeding different plants.

Among numerous accomplishments, he produced hybrid walnut trees that grow twice as fast as the usual varieties. He bred a bush form of chestnut with nuts of immense size and bearing when but six months old. One of his chestnut crosses resulted in a variety almost spineless and he anticipated quality chestnuts with burs as smooth as those of walnuts. Science tells us there is an almost unlimited variety of different characteristics latent within the reproductive cells and we can work with the assurance that new and better plants are an ultimate certainty.

Kunderd is world famous for his development of ruffled gladiolus. For more than fifty years he has been raising seedlings and hybridizing. Recently he introduced an entirely new type termed "laciniated", with petals irregularly slashed and notched. Possibly this is the forerunner of a new strain as important as his ruffled glads. Scores of gladiolus breeders have introduced thousands of varieties in the past thirty years. Commercial growers as well as numerous home gardeners have taken up hybridizing as a hobby. Doctors, lawyers, merchants, school teachers and many from other walks of life find gladiolus breeding most intriguing.

Various sections of our country seem particularly suited to certain phases of horticulture, California proving particularly good for seed production. The long dry summers favor the maturing of quality seed. Bulb production from seed, with extremely long growing seasons, means much greater development in a twelve-month period. Enormous seed farms are found in the Golden State and from them we secure many of our finest novelties. One seedsman recently introduced a double nasturtium; another, the new "imperial" strain of annual larkspur. Burpee, one of the leading sweet pea specialists, has immense seed farms in his state where he develops some of the world's finest strains. Annually planting millions of seeds, he studies them constantly in search of varieties sufficiently different to be worthy of propagating.

Roses have long been a favorite flower and every year new hybrids are introduced. Most of them come from professional growers but there is no reason why amateurs should avoid this field. Captain George C. Thomas, Jr. of Beverly Hills, California, has done much in hybridizing roses. Rev. George M. A. Schoener, "The Padre" of Santa Barbara, California, is raising

IRIS HOLLANDIA, "GOLDEN LION"

These Dutch irises are new and the improved forms will be a welcome addition because no other type of iris is so good for cutting or shipping. Below we have the Paeonia macrophylla, a white-flowered species from the Caucasus, an early bloomer. Note the difference in size compared with its progeny, the Chalice.

thousands of hybrid roses each year and sees an even greater future for the "Queen of Flowers". There are plenty of possibilities for new and better outdoor roses. Hardier varieties, less subject to disease and blooming over a longer season are among the types for which we should strive.

Iris breeding has become the hobby of countless flower lovers. It is an ideal subject for hybridizing and the tremendous improvement in modern irises speaks well for this work. The late Bertrand H. Farr was one of our earliest iris breeders and produced some excellent varieties. Until recent years most of the important new kinds came from abroad, and, while European growers are still in the vanguard, American hybridists are making them look to their laurels. It was announced a few years ago that subjecting seeds to X rays had some effect upon the reproductive cells and resulted in variations not attainable otherwise. Out in Oregon a doctor who is an iris fan has been experimenting with X-ray treated seeds and thinks he has obtained some excellent breaks. A French hybridizer has developed irises that bloom repeatedly over a long season. These are dwarf varieties but undoubtedly the recurrent blooming habit can be bred into the tall, bearded types.

A NEW RED CUP NARCISSUS

Still scarce and not yet on sale, this is one of the wonderful new varieties being grown by De Graaff's in Holland

Some plant breeders have made such intensive studies that they work with greater assurance than those going at it simply hit or miss. A southern California grower specializing in tuberous rooted begonias is said to claim discovery of a system by which he can predict results with great certainty. Whatever his system, he surely produces some wonderful results, growing begonia blooms almost as large as peonies. Liberty Hyde Bailey, one of the world's leading authorities upon all phases of plant culture, says there is no certainty in hybridization: "True plant breeding sets an ideal and then reaches it by working along certain definite lines."

In this brief article it is possible only to touch upon many phases of adventuring with seeds. In New York State a professor of chemistry in one of the colleges has a collection of peonies from all over the world. Recently he has been crossing them and producing some delightful new hybrids. Having but scratched the surface of possibilities with these hybrids, he has laid the foundation for others to carry on from where he will some day have to lay down the burden.

The late Mrs. Backhouse of England experimented with hybridizing lilies and got some remarkable new strains. She also secured excellent results crossing narcissuses. One of her originations is termed the "pink daffodil" and is the first important break in this direction. The general effect of the bloom is shell pink and the flower is doubtless the forerunner of a new race of narcissuses. This variety, "Mrs. R. O. Backhouse" is still scarce and costs about $20 per bulb. David W. Griffiths of the U. S. Department of Agriculture has been hybridizing lilies at the Bellingham, Washington, experiment station, obtaining marvelous new things. Here again as with many, many other kinds of plants, there are vast opportunities awaiting the adventurous plant breeder.

According to the possibilities latent in scores of plant families, we are but upon the threshold of opportunity with seeds. During recent years plant hunters have brought hundreds of new species and varieties from the far corners of the world, thus offering in addition to former copious supplies, an almost unbounded stock of new blood with its varying factors that may affect offspring.

Hybridizing trees unquestionably holds great promises but a serious drawback is the years of waiting for the products of cross-fertilizing to develop into maturity. A hickory nut planted today can not be expected to bear blossoms and permit second generation crosses for at least ten years, and it will take several times this to reach full bearing. This means but two or three generations in the active lifetime of even an octogenarian. Some trees, of course, mature much more quickly than others.

As a general rule all seedlings resulting from cross-fertilizing are different in some respects. Frequently they are radically different. Many revert to their former wild

types, others are simply inferior plants or produce poor blossoms. Some are similar to one or the other parent but occasionally a few are found to be improvements over their forebears and once in a while a seedling is of notably superior quality. Scientific plant breeding uses hand pollination and then protects from further cross-fertilization by covering the blossoms. Natural fertilizing by insects or the wind produces haphazard results.

Experienced plant breeders select their parent plants most carefully, having certain traits in mind that they hope may be transmitted. Hand fertilizing is quite simple with a great many plants and consists of brushing the pollen from one variety upon the stigma of the other. This must of course be done at the right time. Different plants vary greatly in structure and to succeed with them you must study each species separately. There is literature upon the subject of hybridizing and those interested in the technical process will find it well worthy of study.

The plant breeder should possess a wide and intimate knowledge of plant varieties that have previously been produced in order intelligently to judge his originations. He should strive to maintain the highest of ideals and use the greatest restraint and discrimination in the matter of the introduction of new varieties. Only those of outstanding merit should be offered to the public. Avoid poor foliage, weak or poorly arranged stems, unattractive colors, susceptibility to disease or any other detrimental factor. Inferior seedlings should be ruthlessly destroyed as there is too much indifferent stuff on the market now. The higher we can keep our ideals and the more religiously we live up to them, the better material future gardens will enjoy. Beauties hardly dreamed of today will become realities and our garden dreams will approach fuller realization. The pathway of him who adventures with seeds may not always lead to its intended destination but it progresses and proves most delightful.

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BEAUTY FROM THE THORNS

BY CARLTON C. GORDON

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ONE would scarcely want a garden of thistles, yet, because they are a part of the beauty of a mountain pasture in late July and August, we hail their purple blossoms with delight. A thistle does not invite a close acquaintanceship but lovers of the out-of-doors who are eager to bring some of it indoors for winter decoration need not be frightened away from it.

The beautiful snow-white puff-ball bears no resemblance to the purple blossom of the thistle so let me tell you how to make the transformation. Choose a blossom that is fully out. Cut the stem long and tear off the prickly leaves. Tear down the spiny flower-envelope, and carefully pull out every purple floret. Then what is left will resemble nothing so much as a shaving brush. Now hang the shaving brush, head down, in a dry place and in a day or so you will be rewarded by a perfect snowball.

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

NEW TINY NEIGHBOR PLANETS

TWO DIMINUTIVE WORLDS FOUND TO USURP HONOR FROM EROS

BY ISABEL M. LEWIS

EVER since its discovery in 1898 the asteroid Eros has held the distinction of coming closer to the earth than any other celestial body with the exception of our satellite, the moon, and an occasional comet and, of course, meteors. At its nearest approach to the earth, Eros is at a distance of 13,840,000 miles. Last year when it was nearer to the earth than it will be for many years to come, it was at a distance of about 16,200,000 miles at nearest approach in January. It was then widely observed because it furnishes a valuable means of determining more accurately the scale of the solar system. It is believed to be about fifteen miles in diameter and varies periodically in brightness, probably due to the fact that it is rotating and all parts of its surface do not equally reflect the light of the sun.

On March 12 of this year a peculiar object was discovered by M. Delporte at Uccle, Belgium which, because of its rapid motion, was at first believed to be a comet. It was soon discovered, however, that it was not only a member of the asteroid group but a very remarkable one at that. Its actual distance from the earth on March 22 of this year was found to be 10,158,000 miles which is about three-fourths of the least possible distance of Eros. Its period of revolution around the sun, or its year, was found to be about two and three-fourths years or a year longer than that of Eros. It was found that its distance from the earth on March 22 was its least possible distance from the earth and another eleven years will pass before it is again as close to the earth as it was then. It has been estimated that this tiny body is less than three miles in diameter. It cannot be more. It has also been noticed that the orbit of this little asteroid and Eros come

within four million miles of each other and it has been suggested that it may once have been a part of the larger asteroid and broke off from it at some time in the past.

For only five weeks did the Delporte planet hold the honor which it had wrested from Eros. In the latter part of April a still more sensational discovery was made. Dr. Reinmuth of Königstuhl announced his discovery at that time of an object that was moving in an east to west direction, or retrograding, at an exceptionally fast rate. Again it was suspected that the object was a faint comet, but after some days of observations and computations of orbits it was discovered that the most remarkable of all asteroids had been discovered. It was a body that at its nearest approach to the earth is at a distance of between two and three million miles, and that has a diameter of only about one mile. The distance of this planetoid from the earth on May 12, when it was observed by Professor Bianchi at Milan, was only 6,750,000 miles. Within five weeks, then, two tiny asteroids were discovered that greatly reduced the record for least distance from the earth formerly held by the noted little asteroid, Eros. So close does the second of these objects come to the earth that it has been suggested that it may even have been expelled from the surface of our own planet at some time in the distant past when volcanic action may have been much more powerful than it is today, or, possibly, that it may have been ejected from our satellite rather than from the earth.

Asteroids, planetoids, or minor planets, as they are variously called, are small bodies found in greatest numbers between the orbits of Mars and Jupiter and at a mean distance of about 270,000,000 miles from the sun. It was at one time believed that they were fragments of a small exploded planet but later it was suspected that they were, rather, debris of the original solar nebula, planetesimals that, because of the presence of the major planets and particularly the mighty Jupiter, were kept from forming into a single planet. It is a remarkable fact that there are gaps in the asteroid belt at certain distances from the sun. If planetoids existed there, their period would be commensurable with that of Jupiter. Evidently the gravitational attraction of the great planet gradually cleared these regions of these small bodies. Similar gaps have been noted in the rings of Saturn which are also composed of hosts of small bodies.

The asteroids differ from the major planets not only in size but also in the shape of their orbits which are far more elliptical and inclined at greater angles to the ecliptic. There are now far more than a thousand of these objects known, and they range in size from the largest—Ceres, Pallas, Juno and Vesta—discovered in the first few years of the nineteenth century and having diameters of 480 miles, 304 miles, 120 miles and 240 miles, respectively, down to the smallest, such as were discovered this spring with diameters of three miles or less. From the time of the discovery of the fourth asteroid, Vesta,—the only asteroid visible to the naked eye—in 1807, up to 1845, no other asteroid was discovered because astronomers were not looking for bodies sufficiently small. During the past forty years the photographic method of searching for asteroids has made it possible to find more than a thousand asteroids. A telescope with a wide-angled lens is used so as to photograph a field of stars five or ten degrees in diameter. It is mounted equatorially and run by clockwork so that the stars will photograph as small black dots on the negatives. If an asteroid is in the field it will appear as a trail rather than a dot because it is moving with respect to the stars. As many as one hundred asteroids have been discovered in a year. Most of the brighter asteroids have been picked up by this time and recent discoveries are of the fainter ones which are only visible in powerful telescopes. These are still being found in large numbers and a thousand or more may still be discovered with the largest telescopes. It is never known when ones of exceptional interest, such as the two tiny bodies discovered this year, may be picked up, or what clue they may possibly in time reveal as to the origin of the asteroid group or of the solar system itself.

Nearly a thousand of the asteroids discovered have been named and catalogued and their orbits computed. This is necessary in order to distinguish between a new asteroid and one that has merely been rediscovered. To find names for such a large family is a problem and many asteroids bear queer names. One group of asteroids known as the Trojan group, consisting of Achilles, Patroclus, Hector, Nestor, Priamus, and Agamemnon, are noted for the fact that their distances and periods are very nearly the same as Jupiter's. They are very faint because of their great distance but are believed to average about 75 miles in diameter. Another remarkable asteroid is Hidalgo which has an elliptical orbit and one inclined nearly forty-five degrees to the ecliptic. It is the only known asteroid that journeys out as far as the orbit of Saturn. The combined mass of all the asteroids is estimated to be not more than one-thousandth of the earth's mass.

The two remarkable little bodies discovered this year, known as the Delporte object and the Reinmuth object at first because it was not known whether they were asteroids or comets, now bear the names of 1932 EA, and 1932 HA. This is in accord with the new plan adopted by many astronomers for naming asteroids. The lettering begins anew every year. Planets that are discovered during the first fifteen days of January have the first letter A, later in January, B, and so on through the year with I and J counted as the same letter. A suffix is added to the second letter, which gives the order of discovery in the half month period, if more than twenty-five planets are discovered in half a month, and if more than fifty are discovered a suffix 2 is added to the second letter. So we find that the Delporte planetoid is the twenty-sixth planet discovered in the first fifteen days of March, 1932, and the Reinmuth planet is the first one discovered in the last half of April. One advantage of this plan is that the discoverer of an asteroid is relieved of the necessity of finding and announcing a name for the troublesome little world he has found, a world which may not be much more than a small mountain or (Continued on page 193)

PHOTO BY CREEN, "NORTH SHORE DAILY JOURNAL"

On Long Island the Robinswood Property Owners Association makes a community event of the George Washington bicentennial tree planting program under the direction of Mrs. George Stowe. In the center are George and Martha Washington as portrayed by Eugene Rogers and Joan Gilroy

TREE PLANTERS READY FOR FALL SEASON

With Fall tree planting time at hand, the tree planting army has gone into action again in the schools, 4-H Clubs, Scout organizations, Woman's Clubs, the Daughters of the American Revolution, and similar societies. The American Tree Association has now registered more than twenty million tree plantings and thousands more will be registered on the Association's Honor Roll before the end of the year. Tree planting suggestions will be sent by Charles Lathrop Pack, President of the Association, to any school, committee, or organization planning to plant.

The living memorial to Washington idea has spread through the world. The registration of two bicentennial trees planted in front of the American Consulate in Amoy, China, has been received from Lynn W. Franklin. The trees were obtained from Ferry Farm, the boyhood home of Washington across the river from Fredericksburg, Va. Mrs. Franklin named one tree for George Washington and one for Mary Washington, his mother. Members of the American community and officers and men from the U. S. S. *Tulsa* witnessed the ceremony.

How famous will become those trees in that distant land! Historic Pennsylvania has had a fine part in the planting of her trees in far off Washington, the state named for the first President. The Rev. W. Herbert Burk, rector of the beautiful church at Valley Forge, sent two trees to James Wright of Richmond Highlands. One of these has been planted on the Masonic Temple grounds by the Grand Master, Thomas Askern. An evergreen tree from Philadelphia Lodge No. 72 also was presented to the Richmond Lodge of Washington state. The bicentennial tree on the campus of the American University in the nation's capital is rapidly becoming famous. It was planted by the National Society of New England Women a year ago and now is flourishing. A group of girls touring the eastern schools under the direction of Mr. and Mrs. John G. Olmstead of Oberlin College saluted the elm as soon as they encamped on the University grounds. Another in Washington already famous is the American elm planted in the White House grounds by President Hoover.

Plantings on big scales are under way in scores of states. Parker Anderson, extension forester in Minnesota, reports a state wide campaign on the part of the American Legion and the 4-H Clubs. He expects to register close to half a million tree plantings. The nation is rapidly becoming tree minded as was the Father of this country who loved and appreciated trees and planted so many of them.

NATURE RAMBLES WITH UNCLE DICK

A DEPARTMENT FOR THE YOUNG FOLKS

Bill Finley is the Field Naturalist and Wild Life Photographer of Nature Magazine's staff. He has had many wild pets, whose lives he has studied and of whom he has taken pictures. In this and coming issues of Nature Magazine, Bill will tell Uncle Dick about these pets and he will pass the story on to you.

• • •

DINTY WAS A PORCUPINE

"THAT'S Dinty," said Bill, tossing me the picture you will find on this page.

"And see who is with him!" I said. "Bill Finley himself."

"Yes, all dressed up," he grinned. "But Dinty was no chap to play with when we were dressed in Sunday clothes. He was too friendly."

"Friendly!" I exclaimed.

"Yes, indeed," said Bill. "He'd climb right up your pants leg to doze in your lap. Dinty, you know, knew no other mother but us. He was the child of a forest accident and came to us as a baby."

"What does a baby porky look like," I asked.

" You know," Bill said, "a lot of people hardly believe me when I tell them that a porcupine is born with quills. Well, it is. Of course, most people know that a porcupine does not shoot his quills. But it's hard to realize that he starts life like a pin cushion.

"Yes, Dinty arrived in a box as others have come. When we took the lid off he stuck his quills up. Although a baby he was on his guard. When we looked at his mouth with two long, sharp teeth we wondered how we should do as parents. But we tried the bottle and nipple and it worked again.

"So Dinty made his home in a box by the fireplace. When hungry he would coo almost like a dove. His meals grew from diluted cream with sugar in it to vegetables. Soon he hunted his own food in the yard and the garden.

"A porcupine is interesting because of the way Nature has helped him to defend himself. He isn't quick. His legs are so short he can't run fast. He isn't built to be a fighter. So Nature gave him a set of quills. Each one has hundreds of little barbs on it. She put quills on his tail so he could slap things with that and stick quills in his enemies. And she made it possible for him to raise and lower his quills so he is pretty much pin cushion all over. So the wise animals leave him alone most of the time.

"Well, in the year Dinty was with us he was a fine pet. He would follow us around like a dog. He loved cantaloupe and watermelon, and loved to eat in the cabbage patch. In the woods porcupines live on bark, leaves and tender shoots. But Dinty had a high class diet with us.

"One member of the family Dinty loved was Peter, our dog. He would try his best to play with Peter. But Peter never could understand why this pet of ours had so many pins sticking out all over him. When Dinty would stand up on his hind legs and try to hug Peter around the neck, the look on the dog's face seemed to say, 'How long do I have to stand this?' And Dinty would coo happily. He liked Peter whether Peter liked him or not.

"When with us Dinty seemed to forget he was a wild animal. He could have hurt a finger with his sharp teeth. He never did, just gently nibbled at a bare hand. He never raised his quills in anger or fear when we played with him. He would let us pull a quill from his tail for a friend, so the quills come out without hurting him."

"So you had him a year?" I said. "And then?"

"Well," said Bill, "Dinty was a wild animal. We could see that he was beginning to know for himself. He would wander further and further away from home. Finally he went back to his woods. I hope he met a girl he liked."

• • •

BROADCASTING IN ANIMAL TOWN

STATION L.A.A. (LITTLE AMERICA, ANTARCTICA)

CHIMPANZEE CHIM, Announcer.

Those present with Chim: Big Brother Bear; Mrs. Goose, little Hans and Greta Gosling.

Pinky Penguin, Radio Artist. "Good evening, folks. I'll begin by telling you that there was much excitement around here not so long ago, when there came to our country some strange, white animals, who walk upright as we do. They brought some of the queerest things along. One of them was a huge, bird-like ship, that flew around, with the white animals in it. They were friendly and laughed at us, as we walked curiously around them, but we don't have many visitors, so it was a great event for us. We heard one of them called Byrd, so concluded they were all birds. And such big, funny-looking birds!

"When one of them said, 'now don't they walk and act like little human beings,' we didn't know what they meant, unless it was themselves, but we tried to live up to whatever it was. They remarked it was strange that we couldn't fly, being birds. After that we showed them how we use our little paddle-like wings in the water and for diving. We belong to the southern hemisphere, seldom going farther north than the Galápagos Islands. Come down to Antarctica sometime and see us."

Chim: "Find Pinky Penguin, Miss Opossum, Mrs. Bear and little brother Teddy Bear, who are listening in on their own radio."

"A SPRING STORM HAD BLOWN HIM FROM HIS NEST AND HE WAS IN GREAT DANGER WHEN RESCUED BY A NEIGHBOR BOY. THE DANGER WAS A PROWLING CAT"

BOB, A ROBIN

BY SARAH ELLEN PORTER

ILLUSTRATED BY R. BRUCE HORSFALL

Bob is a robin. He came to me when he was a very little robin. A spring storm had blown him from his nest, and he was in great danger when rescued by a neighbor boy. The danger was a prowling cat. I agreed to keep Bob until he could fly and then let him go back to his wild world. But when his wings were strong and I put him out in a tree and said goodby to him, he would not go. To tell the truth, I was really glad, because we were such friends.

So Bob stayed. He loved to sit with us on the porch, chattering as we talked. He would hop down the steps for a bug or a worm and come right back. Now and then he would fly to the roof of the house or to a telephone wire, but he would not go into the trees. When I did not know where he was I would call him and he would answer. At bed time he would often hop on my shoulder and cuddle close to my neck until I put him on his perch for the night.

In the winter he had his special corner with a box of sand, a box of dirt and a dish of water. He took several baths every day. After them he would fly into the next room and spread himself out on the hearth before the fire. One time I had been ill for two weeks. When I was able to sit up before the fire I was surprised to look down and discover a little wet bird on the toe of my shoe. Bob had just taken a bath and had found an open door and had come looking for me. From then on he came to see me often until I was down stairs again.

"THIS YEAR HE CAME IN A SNOW STORM AND SAT IN A TREE UNTIL WE BRUSHED THE SNOW FROM A STUMP AND SET OUT HIS FAVORITE CHEESE"

Bob loved to play. When I was at the sewing machine he would sit and watch me. Then he would knock off a thimble or spool of thread and hop to the edge and look down at it. He had a marble all his own and would roll it around with his bill. In the morning he was glad to see me and would fly up to my shoulder. He learned a clever trick when I would tear off a little piece of paper and let it float toward him. He would hop into the air and catch it on the wing. He never missed. After I had tried this several times we stopped. But the next morning I had no paper. What did Bob do but hunt out a piece, tear a bit off and bring it to me to throw for him.

When summer came Bob

lived outdoors. He never seemed to hunt for his food. Instead he would come to the back door and call to get in. Then he would go to his feed box. We found that he liked cheese very much and would rather have bits of fresh meat than worms.

Shortly after his first spring with us another robin came to the window. It called to Bob. He was excited and I let him out. They flew off together. But every day he came back for food. Then, one day, he came with his wife and four babies. I fed the family and put a dish of water out under the trees and the babies right away all took baths. All summer the family stayed, leaving in winter.

Spring came again. It was warm and one morning I was awakened by a little trill. It was the call I had taught Bob. I whistled back. He answered. And each year for six years Bob returned. He no longer comes into the house. But he does come to my window and greet me. This year he came in a snow storm and sat in a tree waiting until we brushed the snow from a stump and put out his favorite cheese. He ate from a box we fastened to the window sill until spring really came.

The friendship between Bob and me was happy because we understood each other and he was free to go and come as any wild bird wishes to do.

• • •

ANSWERS TO SEPTEMBER QUESTIONS

1. Bird banding is the practice of putting light, numbered aluminum bands on the legs of birds to find out their habits of migration.
2. The smallest deer is the mouse deer.
3. It is found in Malay.
4. It stands about twelve inches at its shoulder.
5. The common harbor seal is often called "sea dog".
6. The American bittern is sometimes called thunderpump.
7. No.
8. Practically all mammals have milk teeth that are lost and replaced.
9. Bear cubs weigh nine to twelve ounces at birth.
10. Leo, the Lion, is one of the twelve constellations of the Zodiac.

• • •

CAT OF THE JUNGLE

BY UNCLE DICK

PERHAPS you have wondered what are the beautiful cats on the front cover of this magazine. They are jaguars, known as the most powerful of the members of the cat family found in North or South America.

Most jaguars are found in the tropical regions, but they are known to live as far north as Texas, New Mexico and Arizona and as far south as Argentina. This beautiful cat usually is from six to eight feet long, which is really a big cat and hardly one to have around the house. It is better off living as it does in the low and dense jungle. It likes to live along the banks of wooded streams because there it can catch a big member of the rodent family known as capybara.

Sometimes in the jungles of South America there is found a black jaguar. It is black but through its shiny black fur can be seen the light spots that would be the yellow in the common yellow and black cat. Some have said that this black fellow is more fierce than the other but there is no reason for this.

Men who have gone into the jungle seem to be in doubt whether the jaguar will attack human beings. Some say that he will not, but men who have met the big fellow in the jungles of southern Brazil say he will. The natives say that when a jaguar visits a camp he first will make off with the dog. If there is no dog he will take an Indian. If there is no Indian he will take a Spaniard. This sounds as though the cat were quite choosy.

As one goes north in the tropics one finds that the jaguar has a better reputation. There he is said to stick to getting his food in the way Nature meant him to get it, from other wild life that also lives in the jungle depths. Dr. Anthony of the American Museum of Natural History tells of meeting a jaguar. He was collecting specimens for the museum. Suddenly through the jungle came a peccary, running from something. Dr. Anthony needed a peccary for the museum so he shot. On the heels of the peccary came a jaguar who had been chasing the jungle pig. Even though the cat saw that a man had gotten the peccary instead of himself, the jaguar did not try to attack and went away into the jungle.

Most of us will only see this great cat in the zoo or stuffed in a museum, but we can imagine him in his native jungle as the artist has painted him on the cover of Nature Magazine. And we will agree that he is very beautiful, and we will all hope that the jaguar will not be wiped out by hunters.

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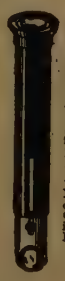

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Important Issue

At the polls on November 8 the voters of New York State will be confronted with a variety of important questions ranging down from the selection of a President of the United States. One of these issues is of outstanding importance to conservationists and lovers of the outdoors.

On the ballot the voters will be asked to give their approval to an amendment to the Constitution of the State which would permit commercial exploitation of the Adirondack and Catskill Parks. Under the present provision of the Constitution some two million acres are specifically protected and preserved as wild forest area. It is now sought to vitiate this protection through popular vote.

The new amendment is authored by Senator Brereton and Assemblyman Porter, who represent the vicinity of Lake Placid. They seek to have this preserve thrown open to allow the building of recreational facilities, although no specific kinds of facilities have been mentioned by the proponents of the measure. At present most of the area is accessible to the camper and outdoor lover who is willing and eager to take his Nature in its natural state. The proposed measure would open this area to that phase of American life represented by the dance halls, soft drink emporiums and the like that have no part in a forest setting, and would permit clearing to erect such structures and roads into them. Speaking specifically of the amendment, Governor Franklin D. Roosevelt says: "I regard it as unnecessary and potentially dangerous." This view is shared by a wide variety of organizations and by a large group of leaders of public thought in New York State.

Common sense demands that this amendment shall not pass and it is to be hoped that the members of the American Nature Association, resident and voting in New York State, will vote against it and work to the end that their great heritage in the Adirondacks and the Catskills may be preserved.

Worm-Ant Battle

Tom Spofford of Erie, Pa., reports on a battle seen from a ringside seat. The combatants were an inch long caterpillar and a black ant about one-eighth of an inch long. Tom reports that the bigger contestant was rolling about and doubling up so that he appeared to be "loony." Meanwhile the ant was busily biting the enemy's throat, jumping away between nips. Tom watched until the caterpillar was exhausted and lay still, whereupon the ant grabbed it by the head and backed off with it. "That showed me what pluck and courage could do," says Tom.

Our Error

In the August issue of NATURE MAGAZINE under one of the pictures illustrating the short article on the scrub pine we supplied a caption stating that this tree is most common on the New Jersey Pine Barrens.

This is an error, since it enters the Pine Barrens only in a few places, although it is locally common in certain areas in the western part of the State.

What are you doing with your

LEISURE?

"FEW people kill themselves by overwork. But some loaf themselves to death", says Dr. J. Clarence Funk in an article in the October HYGEIA, "Is Your Leisure a Menace or a Help?"

Perhaps never before have so many people had so much leisure time. And the use they make of it affects both their physical and their mental health. If they are wise they will bend their leisure to their will, instead of becoming its slave. Sensible regulation of spare time may add years to one's life. Read Dr. Funk's article and learn how to make your leisure time pay dividends in health and happiness.

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Also in the OCTOBER HYGEIA

"Don't breathe it to a soul!" says Dr. Robert H. Brotman in his enlightening article on **"Halitosis"**. . . . In a timely article, **"Death by Football"**, Alfred E. Parker puts the responsibility right where it belongs. It will make a good many gridiron fans stop and think. . . . Dr. John Rurāh tells in **"Polio"** what is being done in Warm Springs, Ga., to convert into useful, happy citizens the patients with infantile paralysis who once sat hopeless at home. . . . In **"Evaporated Milk"** Frank E. Rice and Charles Dillon tell the story of its development—one of the most fascinating and comparatively little known chapters in food history. . . . Why teething is wrongly blamed for most of the sickness of babies is explained by Dr. M. C. Overton in **"The Teething Age"**. Every mother of a baby will find this article helpful. . . . And these are only a few of the worthwhile articles on various phases of health which you will enjoy in the October HYGEIA.

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When you turn on the porch or piazza light of a summer evening the usual order is, "Turn out that light or you'll have all the bugs in creation here!" And you will, because light produces a physical directive reaction that is automatic and involuntary with many insects. This is called phototropism. And now some clever fellow has decided to use that failing of insects to work their doom. He has figured out a mighty smart gadget that is now commercially produced and goes by the name of "Insekiller". It has been tried out in various forms and for various purposes, proving a good servant in the garden and the greenhouse, in the store where doors are constantly opening and shutting, in the model barn and elsewhere. It treats the insect pests just as more gangsters ought to be treated —with a quick doze of electrocution. And all you have to do is to hook it up and turn the electric light switch. Now why didn't someone think of that before? We can't use the editorial columns of Nature Magazine to advertise things, but we thought that our readers would be interested to hear about this new affair, and we will be glad to give them more information if they will just drop us a line.

Excellent, Mr. Wells!

"Big game hunting is a juvenile sport, not worth a grown man's attention, and it is needlessly cruel to animal life. There is nothing heroic about it," declares Grant Carveth Wells, explorer, lecturer and naturalist.

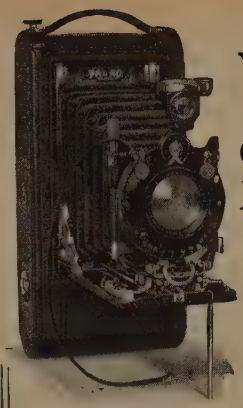
And, commenting upon this excellent statement of fact, the *Brooklyn Eagle* remarks pertinently:

"Mr. Wells is entitled to much credit for the efforts he has been making to debunk the big game hunters. He has lent large moral support to the project of giving lions and leopards, elephants and hippopotamuses international protection. Trophy collectors, often in motorcars, always with high-powered rifles, should be curbed. They have no standing at all in the high court of civilization's sentiment."

"Ding" Helps

None who has had the privilege of seeing regularly the notable cartoons drawn by Jay N. Darling, better known as "Ding", can fail to realize that he is a sincere and militant conservationist, intensely interested in the protection of wild life and the natural beauties of our country. His cartoons have provided many telling arguments, and it is now announced by the Iowa State College at Ames that Mr. Darling has made a gift of $9000 for a special study of the problems of wild life conservation in his native state. This sum is matched by a like amount from the Iowa Fish and Game Commission.

"Conservation, like agriculture, is faced with the need for better cropping methods," Pres. R. M. Hughes of Iowa State College said in announcing the Darling gift. "Iowa's game and wild life resources will be restored to the extent that the Iowa farmer is encouraged to provide food, cover and protection for the natural propagation and increase of the particular species suited to his farm. The first step is to find out just



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what foods, coverts and protective methods are effective, and how they fit in with good agricultural practice. The funds will be used for experiments and investigations aimed to build up game and wild life as a by-product of Iowa farms."

Editors and Rejections

Many contributors and would-be contributors to the pages of magazines are convinced that editors are hard-hearted individuals unable to appreciate real merit, and that they delight in using up the supply of printed rejection slips on hand. NATURE MAGAZINE uses a rejection slip when the pressure of time makes it necessary. Otherwise the Chief of the Editorial Staff tries to send a note along with the returned contribution (and they are all returned right now because he isn't buying anything) and to be helpful at the same time. He feels that every contribution, whatever its merit, represents a desire for self-expression, which is a healthy desire. He feels that life is too short to be unnecessarily curt and impersonal, and that a friendly word takes only a minute or two and adds a bit to the sum total of human happiness. Now and then he gets a note from a writer thanking him, as with the following verse:

You'll hate to see my name again
But, somehow, I just can't refrain
From saying, "Thanks" for that nice letter
Although I'd like a check much better.
In times like these, when checks are few,
Rejection slips make one feel blue,
But, sugar-coated, as you make them,
It isn't quite so hard to take them.
So here's my thanks in foolish rhyme,—
I'll send you prose,—some other time!

Insects on Ice

A new refrigerated traveling compartment for insects makes it possible to send adult parasites reared in the laboratory to orchards where they can prey on the oriental fruit moth, a destructive foe of fruit growers.

It is one thing, entomologists of the United States Department of Agriculture say, to bring to maturity a colony of parasites to help to combat insect pests, and quite another to transport the parasites considerable distances for liberation in the infested areas. Many of the adult insects grown in large numbers at the department's experiment station at Moorestown, N. J., to parasitize the oriental fruit moth are so frail that they can not stand a long trip in hot weather.

To prevent the bad effects of the necessary long, hot trips, Government entomologists have devised a refrigerated container which seems to keep the parasites healthy and comfortable through a 50-hour journey. Wooden cages having a capacity of 300 cubic inches and holding about 500 oriental fruit moth parasites are packed with dry sphagnum moss in a metal cylinder provided with a tight-fitting telescopic lid. The cylinder is placed in a 40-quart ice cream shipping tub, which is then filled with sawdust and cracked ice.

The success of this method of insect transportation in 1931 has led to its general adoption in shipping adult parasites from Moorestown on all but very short trips.

Potomac Trail

Up to date information as to the exact onditions prevailing on the section of the reat Maine to Georgia trail between Harisburg, Pa., and the Tennessee line is to e found in the latest bulletin of the Potomac Appalachian Trail Club. This litle publication also provides information bout transportation lines to the trail, disances and special features along it and ther pertinent data. The Club has also otten out a fine little pocket pamphlet with the title "List of Hiking and Camping Equipment." Every hiker and camper should ave this for the carefully compiled and ompactly arranged information that it conains. It can be obtained for twenty-five ents from the Club whose headquarters are 519 Metropolitan Building, Washington, D. C.

Johnny Darter

Johnny Darter may be regarded as both n interesting and valuable addition to the ome aquarium, according to Neil O'Donoghue of Bridgeport, Connecticut. Being hort of scavengers he captured a few of hese little fish from a nearby stream, placing one in a bowl with a pair of paradise fish. Although these tropicals usually worry other fish, Johnny got along nicely. Mr. O'Donoghue feels that a properly-balanced aquarium of about two gallons will hold two paradise fish and one one-inch darter and the ensemble will make a most attractive effect in contrast.

An Ouzel Nest

By Betty Wallace

At the head of an artificial lake created by power development and at a point where the Oak Grove River empties into this lake, two Water Ouzels have chosen a place for nesting. A cedar stump, the top of which is only eighteen inches above water, is serving as the island for the nest. All around the stump the water is running at millrace speed and possibly because of the foreknowledge of the wild the eighteen-inch freeboard has proven sufficient, although nearly every year the stump is overflowed by the spring freshet occurring at nesting time.

The nest is constructed of moss and twigs and securely anchored to the top of the stump and the conical shape with the one little doorway suggests the Eskimo Igloo. No water even from the hardest rain seems to soak through the tightly woven moss thatched roof.

From morning until night both birds are kept busy feeding their two fledglings with some kind of worms secured by diving around submerged stumps. These worms are dipped in the water just before being fed to the young. Bread, placed on the stump was also given a soaking by the birds before they would eat it or give it to their little ones.

Very little concern is shown by either bird when a human approaches the nest by means of a rowboat. The male warns the mother if she happens to be inside and both retire to a nearby stump, returning as soon as the boat is rowed away. This is the second year that these birds have nested in the same manner. Another stump was used last year, construction work neccesitating the moving of the nest from the stump before the young were ready to fly.

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TO THE EDITOR,
NATURE MAGAZINE:

I have read with interest the story of the pet centipede appearing in your August issue of NATURE MAGAZINE. It is indeed interesting, but the author's assurance that the centipede "is feared without real reason" could be very misleading. It is possible she has seen only the sunny side of her pet's disposition. About a year ago I was stung by a five-inch centipede of the genuine desert variety, and can offer some first hand information on the subject which may also prove of interest to your readers. Let me say here that first aid manuals instruct, for centipede and scorpion stings, specific first aid treatment, which every one who lives where these insects abound will do well to have on hand and remember to use as directed if need arises, and when this has been done, quoting first aid—"then call the doctor." I was stung on my right leg, just below the knee, and when I saw what had stung me, call it fear if you will, I could easily have believed it was five feet long instead of five inches, and as Mr. Centipede wound his way around my ankle, my reactions were not exactly those of solid comfort and good health.

When a centipede is really under way with all his feet seeming to move at the same time, there seems to be much more of him than actually exists, even when one has not just been stung. My son, who was present at the time, promptly finished off the centipede, assisted in applying first aid, and then phoned the doctor, whose questions were brief and to the point and certainly indicated that the sting of a centipede can carry with it very serious complications. First he asked where was the wound and how did I feel and had I applied first aid. We seemed to have done just the right thing. Then he inquired if any of the centipede's feet had been left in the skin or flesh. Close examination proved that none had been. Right here let me say that observation and experiment will show that the legs of a centipede are very brittle and break off into pieces from a blow that does not seem to injure its body—and whatever provocation causes the centipede to sting also causes him to "dig in" with all his needle-like feet, and if he "digs in" deeply enough, his needle-like feet will remain in the flesh after the centipede has been disposed of. The fact that I was wearing hose at the time and also that the centipede's provocation was not too great, probably prevented serious consequences in my own case, but enough poison from the sting had been injected to cause the usual numbness, which, however, had been lessened due to prompt and proper first aid, and for several days the spots where all the feet had touched stung and burned.

The doctor advised that in case any of the centipede's feet were left in the skin or flesh, they should be immediately removed and the wounds properly and promptly

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eated, because—to quote—"sometimes the avest and most serious cases of infection e have follow these wounds from the ntipede's feet, not from its poison sting, it from germs gathered on the feet as the ntipede crawls over the ground." This ct no doubt has given rise to the tradion that "the flesh decays and falls out" herever touched by the centipede. Cerin it is, the centipede does not choose a erilized path as he goes along, and there every chance of its feet being contaminatd. Bee stings sometimes prove fatal. Stories re told of untreated rattlesnake bites which ave not proved fatal. But no matter what ories are told as to why's and wherefore's, r imagined or actual results of them—the ne big thing to remember, is to take roper precautions in the first place to void being stung, or bitten, by anything, emembering that every poison sting is a eal and genuine hazard, and if one is tung, have the wound treated promptly y someone who knows what to do. Selom does anyone know how much of any pecific kind of poison a person's system an tolerate or overcome without serious onsequences to them. The wise parent eaches his child that all living creatures re interesting, and encourages his interest nd study of them, and he also teaches him hat if an insect or animal has been furnished with a sting, provocation will make ts certain use imperative, and that it is never harmless. Let those of us who will, have centipedes or scorpions, or rattlesnakes or Gila monsters for pets or for study—and we need not be afraid of them, but we should never for a moment try to minimize the possible potency of their sting. Let us be wise and be careful. Safety First!

MRS. J. P. G.

Indiana Audubonists

Much that is of general and specific interest to bird lovers is to be found in the one hundred-page year book of the Indiana Audubon Society. Among other features there is an interesting description of the bird sanctuary scientifically planned and equipped by William Vogt for Culver Military Academy. Under the title of "Robin Items", Dr. Earl Brooks has gathered a variety of fascinating notes on the life and nesting habits of robins, proving that these birds are without limit in their versatility and originality of habit. A carefully and completely compiled story of the parasites of birds is contributed by George Zebrowski. The Society specially calls upon its members to support the official selection of the cardinal as the State Bird of Indiana, a bill in favor of which will be introduced into the next session of the State Legislature. An appeal for increased membership is also made and Indiana bird lovers would do well to get in touch with Miss Margaret R. Knox, 4030 Park Avenue, Indianapolis, the Secretary-Treasurer. Copies of the Year Book are also available from Miss Knox at one dollar a copy.

Friend Mantis

One of the best friends the gardener can have in his war against injurious insects is the praying mantis, according to entomologists of the New York State College of Forestry at Syracuse, New York. They have noted the spread of this big, loose-jointed insect through New York State and hasten to urge those who encounter it to treat it in friendly fashion. When young the mantis feeds on plant lice and other small insects, and with increased age, size and appetite takes on a diet of caterpillars, slugs and other insect pests.

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A Thrush Episode

By Mildred LaFevre

It was six years ago that our family witnessed what we called our first "country spring. It was quite a delight, after years of city life, to see so many, many things come to life at once. The most noticeable, of course, were the trees, with their little specks of delicate green. But the most thrilling thing we saw, after a bit of hunting, was a wood-thrush nest. In a big, old beech tree, it was, perched precariously in a none-too-spacious crotch. Once found, the queer dwelling was quite obvious. Though really rather small, it had the appearance of being quite large, for, floating from every possible crevice, the crafty little couple had pasted long, white streamers of cloth or tissue paper. It was soon called a "Spanish Bungalow" for its festoons were certainly not unlike the many decorations put on these modern homes of ours.

Being naturally interested in Mr. and Mrs. Thrush and family, we kept a pretty close watch on them. They were really quite tame, and did not seem the least bit frightened when we really came quite close to them.

But my real story is about wood-thrush jr. Early one summer morning, quite a chattering was heard in front of the house. Running to the scene, we saw that the baby bird had fallen, in some unknown manner, into a deep pit, which is the life-saver of a large oak tree. He, of course, was making quite a row, but his mother was much upset. She was running around in circles, as we say, shrieking at her son, but of course neither one could do a thing about it, so it was all quite useless. Then we came to their aid. A small basket was lowered and the chick urged to jump into it. He was finally elevated, much to the mother's relief. But she was not through with her scoldings, and the youngster was obliged to walk, or fly, as best he could, the rest of the journey into the woods.

It was a queer sight, to see this nervous jumpy little mother urging her son on his way with scoldings and taunts. To watch them was much like witnessing the game "Red Light" that children play, reversed. Instead of running forward as far as possible when the leader's eyes are closed, the little fellow would run along while his mother watched, but as soon as her back was turned, he would stay, as if from exhaustion. It was a slow procedure, for she would often dash back to him, flapping her wings, chirping shrilly.

Finally they disappeared from sight, as the little fellow was gotten safely to the woods. Each year a family, whether the same one I can not tell, has returned to the crotch in the tree. Last summer there was a new nest, with new, white tissue paper banners floating gayly, joyfully, from each little crevice. It seems to be a sign of joy, this happy little family with its gayly floating streamers.

Nature Trails

Six carefully planned Nature trails remain in the different county and city parks of Buffalo, New York, having been created in connection with centennial observances and having now been placed on a permanent basis. The trails were established in cooperation with the Buffalo Museum of

Science by the Camp Fire Girls, the Girl Reserves, Girl Scouts, Boy Scouts, Allegany Field and Trail Club and the Woodcraft League. Nature lovers visiting Buffalo should not fail to drop into the Museum and find out how to reach one or more of these parks and there follow the trails. The Buffalo Museum has been a leader in the development of the Nature trail idea.

New Tiny Neighbor Planets

(Continued from page 179)

even a huge rock hurtling through space, and spinning on its axis. Its density is probably about that of the earth's surface rocks or of the moon, and it is probably far too small to have been molded into a spherical form in cooling and rotating as in the case of the major planets. So slight is the gravitational attraction that would hold one to the surface of these small worlds that, if he could get a foothold upon one, he could easily hurl a stone with sufficient velocity to send it off into space never to return, and could depart from it himself in an aeroplane. Of course there would be no atmosphere on such small worlds and life on them would be out of the question.

In October we find that Saturn is the only planet visible in the evening sky. It will be found in Capricornus and on October 22 will be in quadrature, or ninety degrees distant from the sun. It will then be on the meridian due south at sunset. Mercury is an evening star this month but too close to the sun for observation.

Mars passes from Cancer into Leo about October 20, and rises about 12:30 A. M. on October 15. Venus and Jupiter are both morning stars this month and are in conjunction on October 19 when Venus will be very close to Jupiter on the south, appearing almost to form a double star with it. Both planets will be found in the constellation of Leo.

Among the stars, Formalhaut is now a beautiful object in the southeastern sky in the evening. Capella is rising in the northeast and Altair and Vega are still well in view in the west. In the eastern sky the constellations of Pegasus and Andromeda and Perseus are now conspicuous and, north of Andromeda, Cassiopeia and Cepheus, the five forming the well-known Royal Group.

The constellation of Aries, The Ram, first of the zodiacal constellations and one of the smallest, will be seen in the eastern sky southeast of Andromeda. Its brightest star, Alpha Arietis, or Hamal, is a star of the second magnitude. Aries contains only three stars noticeable to the naked eye, lying in a short curved line. Not far away the Pleiades are now appearing above the eastern horizon. The Milky Way is particularly beautiful on clear, cold, frosty, autumn nights arching across the zenith from near Capella in the northeast through Perseus, Cassiopeia, Cygnus, and Aquila to Sagittarius and Ophuichus now on the southwestern horizon. One cannot expect to see the Milky Way to advantage from city streets, however. Only on the farms, the prairies or the mountains or on the sea may one see the Milky Way in all its glory and marvel at the myriads of suns that form part of this great stellar system that extends into space thousands upon thousands of light years.

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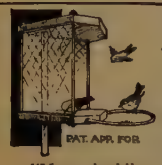

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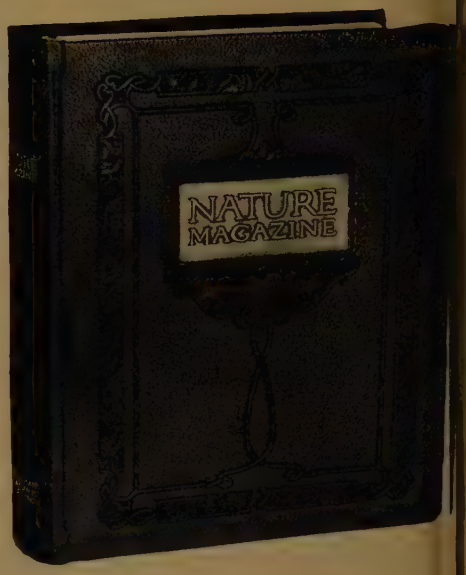

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life and their first chapter is devoted to the question of how living things obtain food. From this they proceed to growth, relationship to surroundings, maintenance of kind, relationship one to another, adaptation, behavior and relationship to man. The result is an interesting, logical arrangement of material that cannot fail to hold the interest of the student and to impart a better-rounded appreciation of fundamental biology. A school man would be better qualified to comment on the exercises provided with each chapter than are we, but to us they seem admirable. The book is profusely and helpfully illustrated. It is published by Scott, Foresman and Company of Chicago and sells for one dollar and sixty cents, list.

Park Education

So significant and valuable has been the increase in the educational activities of the National Park Service during the past few years that it is particularly appropriate that some summary of accomplishment should be made. This is now done in a pamphlet entitled *Research and Education in the National Parks,* by Harold C. Bryant and Wallace W. Atwood, Jr. This publication reviews the educational program in the National Parks, both generally and with relation to specific parks. It serves to give the first really comprehensive idea of what one may take back of true value from a visit to one or more of these great recreational areas. Copies are available from the National Park Service and there is nothing in our copy to indicate that there is a charge for the pamphlet.

Depression Plant

Far be it from us to add to this depression, which we all hear so much about, but this little item might be of some interest to readers of NATURE MAGAZINE since it relates to what has been called "The Depression Plant." Wash a piece of coal and place it in a bowl or dish (soup dish preferred). Pour over it a solution made of five tablespoonfuls each of water, laundry bluing and salt. Then in 48 hours see what happens! Every two or three days pour over it the same solution but in half the quantity. The coal becomes covered with a crystallization of pretty colors, and when it grows up to the edge of your dish you must wipe it off, for if it falls off on the table or piece of linen it spoils it. So best place the dish on a tray or something it can't hurt. The growth is a fine powder, and shakes off very easily so the Depression Plant likes a place where it won't have to be moved. If you want your plant more highly colored put a drop or two of mercurochrome on the coal. These plants are very lovely; as the formation grows thicker it is like little flowers.

Credit Due

On Page 126 of the September issue of NATURE MAGAZINE we published a picture of a garter snake without giving credit, as we should have done, to the New York Zoological Society. The photograph was from their excellent collection of reptile photographs. Credit is also due the Keystone View Company for the picture of pickerel weed that appeared on Page 120 of the September issue.

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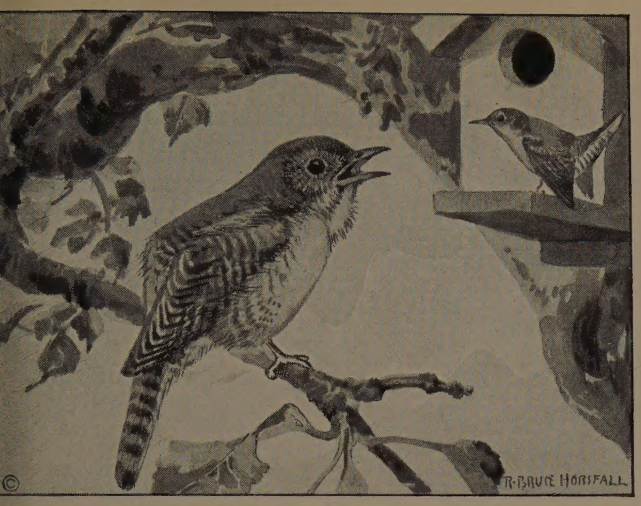

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